

DR. J. PERNISCH

TARASP-SCHULS



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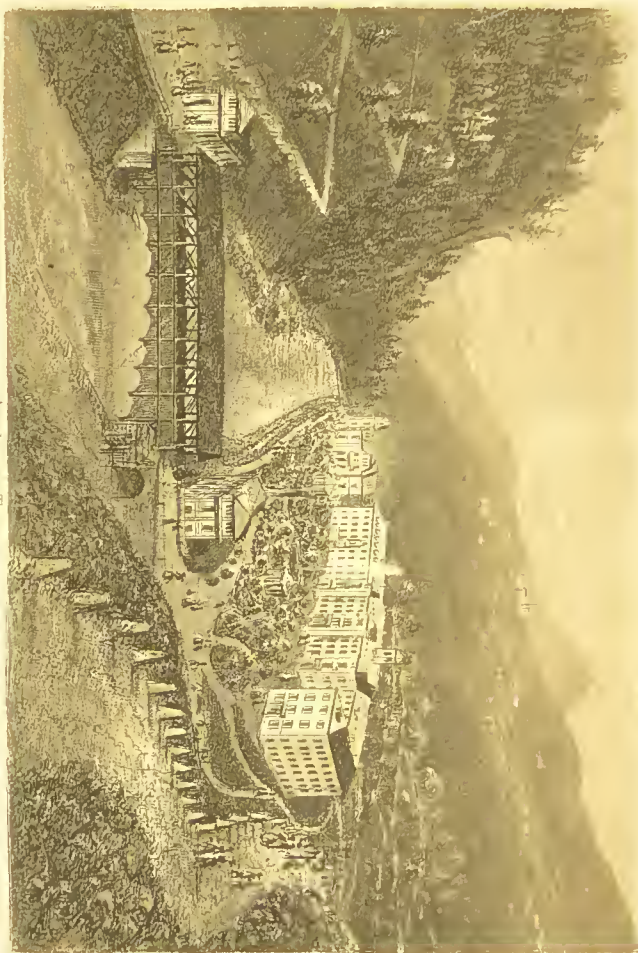




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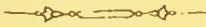


THE BATHS
OF
TARASP-SCHULS,
ENGADINE.

A brief description of their climatic and medicinal
properties, etc., for the use of Visitors and
Members of the Medical Profession.

BY

Dr. J. PERNISCH,
Spa-Physician at Tarasp-Schuls.



SCHULS:
DANIEL STÖCKENIUS.
1881.





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I. Topography.



The health-resort of Tarasp-Schuls is situated in the south-east of Switzerland, in the elevated Alpine valley of the Engadine. No longer the quiet and lonely spot it was a quarter of a century since, the Engadine has now become one of the principal centres of attraction for tourists from every part of Europe. It is watered in its entire length of 59 miles by the River Inn, which enters the Tyrol at Martinsbruck (St. Martin's Bridge) and after a course of many miles, flows into the Danube at Passau.

The valley is divided into two parts of unequal extent and of great diversity with regard to their climate and scenery. The upper part, the Upper-Engadine, with its extensive meadow-lands, its glassy lakes, its trim villages, its vast and majestic masses of granite and its glittering glaciers, has

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rapidly risen into prominence and become, in a brief space of time, one of the most frequented districts of Switzerland.

Upon entering the Lower-Engadine the character of the landscape undergoes a complete change. The mountains on each side draw nearer to each other and thus the valley becomes narrower, while the waters of the Inn are often lost to sight in the depths of the dark and wooded gorges through which it rolls. The elevated plateau now gives place to a system of terraced basins, on the north side of which stand the majority of the villages of the Lower-Engadine. Opposite the flowery pastures, the waving cornfields and the pretty villages rise the precipitous steeps of the southern mountains, covered with a dark and luxurious forest-growth, and high above these tower the inhospitable and fantastically-shaped mountains of limestone.

The tranquil and majestic, although somewhat monotonous, scenery of the Upper-Engadine contrasts strongly with the more varied, more wildly romantic and more brightly coloured landscapes, which meet our eye in the Lower-Engadine.

The hollow in which Tarasp-Schuls is situated lies almost in the middle of the Lower-Engadine, in longitude $10^{\circ} 15' 24''$ east of Greenwich and between $46^{\circ} 46'$ and $46^{\circ} 48'$ of northern latitude, and takes the direction of W. S. W. to E. N. E. It is distinguished from the many other similar hollows occurring in the Lower-Engadine, by its greater breadth and by the circumstance, that the ravine of the River Inn divides the valley into two almost equal portions, of which the southern is here plentifully sprinkled with picturesque farm-houses and well-cultivated fields. The valley, which in other parts of the Lower-Engadine may rather be regarded as a ravine, here widens in places to quite a respectable breadth, while the Inn which has hitherto foamed and roared at the bottom of its rocky channel, frequently concealed from view, now begins to flow in gentler measure. The valley is bounded on the left to the north-west by the Plateau of Ardetz, 900 feet in height and sinking in steep and barren terraces to the valley below; above this are visible the precipitous and dark-coloured pyramids which

form the south-western spurs of the Silvretta group. The Silvretta Mountains form the connecting link between the Lower-Engadine, the Prättigäu in the northwest, and the Austrian Alpine valleys of Montafun and Trissanna in the north. The northern boundary of our valley rises but gradually against these giant ramparts, with their extensive glaciers and fields of snow. From among the fertile fields and pasture grounds rise by degrees precipitous mountains with rounded summits, behind which soar threateningly the peaks of the Piz Glüna (9147 feet), Piz Minschun (10,076 feet) and Piz Champatsch (9623 feet), and from these stretch long ridges, sinking towards the converging valleys of Val Tasna and Val Sinestra, and connecting the above-named mountains with the Piz Fatschalv (10,430 feet), the south-eastern spur of the Silvretta-group; while in the rear the Fluchthorn, entirely encircled with glaciers, reaches an altitude of 11,000 feet, thus rising more than 7000 feet above the valley. From the Piz Minschun and Piz Glüna a broad terrace of pasture-ground descends to the village of Fettan, situated at an elevation

of 5,404 feet and visible from a great distance; while to the south rise rugged and barren precipices. In the north-east, in the direction of Schuls (4088 feet), the terrace gradually decreases in elevation, and behind Schuls, below the Piz Champatsch, is another rugged and hilly plateau, on which stands Sins (4702 feet), the largest and most populous village in the Engadine. The spurs of this terrace again lessen the width of the valley, and at a distance of about 5 miles from Schuls, behind Remüs, a gorge, called the "Platta Mala", leads into the smaller and less elevated hollow of Strada (3478 feet). At Martinsbruck (3396 feet) the bridge over the Inn and the deep ravine of the Finstermünzschlucht form the boundary-line between the Engadine and the German Tyrol and separate Switzerland from its powerful neighbour Austria, while the mouth of the valley is closed by a mountainous ridge, which here crosses it in a slanting direction.

On the right-hand side, the valley or hollow in which stands Tarasp-Schuls, begins just at the spot where the Inn, rushing impetuously at the bottom of a deep gorge through the granite rocks of Ardetz,

makes a sharp curve to the north. The river then flows round the extensive plateau of Tarasp, which is on this side of no great elevation and which is divided into two terraces of unequal extent. On the lower terrace, which is also the larger, stands near the springs the hamlet of Vulpera (4183 feet), consisting chiefly of hotels and boarding-houses. On the heights above is the village of Fontana (4597 feet) with its Capuchin Hospice, and the various other hamlets and groups of houses which are included under the collective name of Tarasp. Near Fontana stands the ruined castle of Tarasp, its white walls mirrored in the clear waters of a little lake; the prominent position it occupies, perched as it is upon a steep and rugged rock of slate, renders it visible to the traveller in the Lower-Engadine at a considerable distance, and it may be easily distinguished at the Flüela Pass and at Norberts-Höhe near Nauders. Upon this terrace there rises a small but steep plateau, surrounding the silent and lonely Black Lake. The entire landscape is bounded on the north by the River Inn, its waters, of a hue between

green and gray, rushing through the ravine they have cut for themselves in the rocky surface; on the west and east by the wooded gorges of the Plafna and Scarl valleys; on the south by the huge, ice-crowned pyramid of the Piz Pisoc (10,427 feet), the Piz Zuort (10,243 feet) and the Piz Plafna da Dour or Outer Piz Plafna (9,784 feet), immediately behind which rises the Piz Minger (10,197 feet). To the east of the Piz Pisoc, separated from it by the dark and narrow gorge of the Scarlthal, rises the forest-girdled pasture-ground of St. Ion, crowned by the Piz St. Ion (9,981 feet). Then comes the Piz Lischanna (10,181 feet), on the side of which opposite to the valley there is a glacier of considerable extent. Next in succession, southwards, are the Piz Madlain (10,174 feet), the Piz Cornet (9951 feet) and the Piz Cristannes (10,237 feet). At the Piz Lischanna begins the mountain-range, which forms the south-eastern barrier to our valley — the Piz Ajütz (sharp or pointed Peak, from the Latin *acutus*), 9144 feet in height, the Piz Schallambert (8783 feet) and the Piz Lat (9190 feet). The last-named mountain joins the Nor-

bertshöhe, near Nauders, already mentioned as stretching across the northern entrance to the valley.

The mountains situated in the district which we are now describing, from Piz Plafna da Dour to Piz Ajütz, reach in every instance a height of from nine to ten thousand feet, and their summits are thus from five to six thousand feet above the valley.

The Kurhaus Tarasp-Spa is placed about midway in the valley, at the spot where it widens to a more considerable breadth, and is almost surrounded by the mighty mountain-ranges described above.



II. Geology.

A single glance around our valley is sufficient to reveal to the geologist an extraordinary abundance of remarkable and interesting facts, and no attentive observer can fail to notice the various forms assumed by the mountain-summits. While those on the north side, in the foremost chain, are of a rounded form, rising gradually from the verdant pasture-lands which charac-

terise the "Algäu-slates"*; to the west, at a considerable distance, tower iron-gray peaks, varying in shape from the massive pyramid almost to the slender obelisk, and which we may recognize as consisting for the most part of crystalline slates. To the south our eye is captivated by the long chain of limestone-mountains, their outlines bearing a striking resemblance to a row of majestic castles, with their turrets and battlements, — fit abodes for a race of Titans. Weather-beaten crags and jagged ridges alternate with deep clefts and channels of considerable width. Here the strata all take the same direction, while at a little distance they are contorted to such a degree that the newer formations now lie beneath those of more ancient date; such disturbances of the original order of superposition of the strata are so frequent in this district as to be the rule rather than the exception. The narrow limits of our pamphlet prevent us, however, from entering upon a discussion of these interesting phenomena, which are treated at considerable length by Prof.

* Slates, which form part of the upper Lias Formation of the Alps.

G. Theobald in his work entitled "Geologische Beschreibung der nordöstlichen Gebirge von Graubünden" (Berne, 1863), and we can only offer the reader the following short sketch of the geological features of this district.

Characteristic of the Alps, which by no means form, as was formerly believed, a continuous chain, are the various *central masses*, around which the remaining members of the geological district are grouped. These central masses are remarkable for the fact, that their centre and the parts in contact with it consist of crystalline rocks, for the most part in vertical layers, and between these are isolated deposits of sedimentary rocks, such as at a certain distance from the centre form wide zones.

In the region of which we are treating, the Silvretta Group is the most conspicuous, its snow-crowned summits mostly attaining an altitude of 10,000 feet. The eastern range of this group, with the Jamthaler Ferner, bounds the northern side of the valley, while an off-shoot of this central mass, the Zernez Group, forms a part of the southern boundary, the remainder of

which must be regarded as a spur of the imposing Oetzthal Group.

On the north side the crystalline rocks of the Silvretta Group describe a wide curve around our district; they consist chiefly of hornblende schist, alternating with gneiss and mica-slate. Then comes an extensive sedimentary formation, which by reason of its frequent occurrence in this part of the Alps is termed the "Bündner Schiefer" or Grisons schist. The geological position of this formation cannot yet be defined with certainty, owing to the scanty supply of fossils which it has hitherto yielded. It must probably be classed with the Algäuslate and regarded as belonging to the Lias or lower Jurassic formation, so that it would seem that the Trias formation is wanting on the left side of the valley, the Lias being superimposed directly upon the igneous rocks. These sedimentary strata form an undulating surface or a number of small basins separated by ridges. A ridge runs parallel with the bed of the river, and from this ridge a hollow descends somewhat abruptly southwards towards the river, forming the terrace upon which Fetz-

tan, Schuls and Sins are situated. In this same direction or parallel therewith, the numerous Mineral Springs are found, with the exception of that in the Val Plafna, and in this direction, too, are the interesting gaseous cavities, the so-called *Mofettes*, which exhale carbonic acid gas in large quantities. Higher up there runs another ridge, in the same direction, namely from south-west to north-east, from Piz Minschun to the Val Sinestra near Sins. On the west side the crystalline rocks of the Silvretta Group again appear in the Piz Cot-schen (9938 feet), and in the Piz Minschun, here uniting with the serpentine of the latter; indeed everywhere in this valley serpentine takes the place of granite as the chief representative of the plutonic rocks. Further westward, at Zernez and Lavin, the igneous formations extend across the river to the southern side of the valley, and there form the Zernez Range, a continuation of the Silvretta group reaching as far as Suren, a hamlet opposite to Ardetz and the Val Sampuoir. Here on the boundaries of the district which we are describing, the sedimentary formations com-

mence, the Trias reaching on this side an immense development in huge limestone mountains. The predominating rock is dolomite, and this lends the scenery that air of wildness and barrenness, but, at the same time, of grandeur and magnificence, which characterises the chain of mountains on the south side, already described. Grand as this formation may seem, it forms but an interruption in the crystalline formation, which soon appears again in the Val Scarl and the valleys which open into it. Below, on this Bank of the Inn, we again find the Bündner Slate, viz. gray - foliated grit, calcareous schist and also black clay-slate. Here, in the same direction as upon the other side of the valley, mineral springs rise from the Bündner slate, and among others the most important of all, the "Lucius Quelle". From here volcanic rocks, crystalline metamorphic slate, and Triassic sedimentary formations alternate with tolerable regularity in narrow belts. Thus the Lias slates of this side, mentioned above, are followed by the lower Serpentine stratum, then comes a narrow belt of older slate and lime-stones (red and green slate, crystal-

line limestone and Casanna slate or phyllite), above this, the lower gneiss stratum, perforated in places by granitic rocks, and a flat basin of phyllite and other Trias formations. Then follows the so-called upper serpentine stratum, which reaches a very considerable breadth at the foot of the Piz Pisoc, and upon which the greater part of the village of Tarasp-Fontana is built; while diorite is the predominating rock at the hamlets of Vallatscha and Aschera. At that spot in the Plafna Thal, where the lofty, needle-shaped diorite rocks meet the steep precipices of serpentine, the hitherto completely neglected sulphureous spring of Tarasp-Schuls pours from a narrow and almost impassable gorge.

The second and upper ridge of crystalline rock now succeeds, and by this a crystalline masses at Nauders are united with the Zernetz Mountains, and thus with the central Oetzthaler and Silvretta Groups, in the same manner as by the lower ridge previously referred to. Next follow the lower Trias formations, here only slightly developed, and above them rise the mighty limestone and dolomite mountains.

The summits of the remaining mountains forming the southern boundary of the valley, part of the Seesvenna Group, which, as already stated, are united with the Oetzthaler Mountains, also consist of dolomite, while their bases show nearly the same structure of narrow belts above described.

Near Ardetz the Inn flows for a time through the anticlinal fissure of the Lias slates, but soon takes its further course through a natural basin in these slates. The valley from Ardetz to Nairs (Kurhaus Tarasp) may thus be classed among those formed by denudation, while from Nairs to Remüs it is a valley of elevation.

Not only does the remarkable manner in which the strata are here contorted, afford the geologist ample opportunity for speculation and study, but his interest is also awakened by the very frequent though slight earthquake-shocks experienced here, as well as by the extraordinary abundance of mineral springs, mostly rich in carbonic acid, and by the numerous *mofettes* or gaseous cavities previously referred to. The remarkable combination of these phenomena naturally led to the supposition that erup-

tive volcanic forces were in operation at a great depth, but later and more carefully conducted observations of numerous earthquakes have proved that the centres of disturbance, — the so - called *volcanic foci* — are at a depth of no more than from three to twelve miles. A close inspection of the displacement of strata in the Alps, shows that such displacement occurred at a time when the rocks were already hard and brittle.

“The diversity of the phenomena exhibited is therefore a necessary consequence of the sum of the results of each single occurrence”. According to a late hypothesis* the earthquakes may be attributed to the same cause as the dislocation and disruption of the strata forming the mountains, namely to a horizontal movement of the solid rock-masses.

The enormous pressure of the superincumbent rocks and the by no means inconsiderable heat generated by the sliding or slipping of several strata or series of strata, causes a much weaker adhesion in the mo-

* Prof. Heim, Untersuchungen über den Mechanismus der Gebirgsbildungen. Zürich 1878.

lecules composing the rocks, and this also may give rise to a further displacement. These dislocations of the solid masses of rock, sometimes resulting in the folding and distorting and sometimes in the fracture of the strata, are to be ascribed to the effect of solar gravitation*, which tends to impart to terrestrial objects a backward motion, in a direction opposed to the direction of the rotation of the earth. The uninterrupted operation of this force fully compensates for its very slight energy.

Nor is the theory of a volcanic basis at all necessary in regard to the mineral springs. They flow from the Lias slates, which contain the majority of the substances found in the springs, and the remainder may easily be accounted for by the mutual effect upon each other exercised by the great variety of mineral substances which are here in close contact.

* Wettstein, Die Strömungen des Festen, Flüssigen und Gasförmigen. Zürich. 1880.



III. The various localities of the health-resort of Tarasp-Schuls.



Historical Sketch.

The date of the discovery of the important mineral springs of the district is not known, but tradition informs us, that the salt springs were accidentally discovered by shepherd-boys. The first historical notice of them occurs in the sixteenth century. In June, 1561, the celebrated physician and naturalist, Conrad Gessner of Zurich*, suffering from a violent attack of sciatica, came to Tarasp-Schuls, drank the "salt-water" there, and bathed in Schuls. The following year he thus expresses himself to a friend, a physician in Augsburg, regarding the beneficial effects of the water: "Since I drank the saline springs, (a miracle of nature) in the Rhaetian Alps last summer, I have been quite well, and indeed much

* Dr. Chr. Brügger, "Ostrhätische Studien zur Geschichte des Badelebens". Zürich 1863.

better than for many years"*.

After this we find the springs frequently mentioned in the older topographical descriptions and balneological works, though they still attracted but few visitors and these exclusively residents of Switzerland and the neighbouring Tyrol. By degrees, however, the springs acquired such an excellent reputation in these countries, especially after the publication of an exact analysis of their waters in 1822, that in the year 1850 the invalids staying at Tarasp-Schuls for the sake of the waters were six hundred in number, while at St. Moritz (in the Upper-Engadine) there were no more than three hundred**. It was not until 1850, after the enterprising spirit of our century had brought the "iron roads" to the very threshold of our mountains and after the Canton of Grisons had awakened to the fact that its own interests demanded the construction of more convenient roads over the mountain passes, that the chief authority of the canton, the "Grosse Rath", commissioned

* "Postquam superiore aestate in Rhæticiis Alpibus fontem salsacidum bibi, miraculum naturæ, semper bene valui et quidem multo melius quam ante plurimos annos".

** "Bündnerisches Monatsblatt". Juli 1851.

Dr. A. de Planta-Reichenau with the analysis of these valuable mineral waters. This gentleman published the result of his labours in 1859* and in the following year a joint-stock company was formed under the auspices of four of the leading inhabitants of the Grisons. This company obtained from the two communities of Tarasp and Schuls a seventy years' lease of the mineral springs, and immediately proceeded with the erection of a magnificent modern hotel-building, with which we will begin our description of the principal places of the neighbourhood.

A. Tarasp-Spa.

(3888 feet above the sea.)

The building, which was completed in 1864, stands on the north bank of the River Inn, on the site of the former farmhouse of "Nairs" and opposite the most important springs. The structure, which is on an imposing scale, is four-storied and measures about 500 feet in length and 60 feet in height. It consists of the main

* "Chemische Untersuchung der Heilquellen zu Schuls und Tarasp". Chur. 1859.

building, which stands somewhat forward, and of the two wings joining it at a slight angle. The design adopted is a witness to the good taste of those responsible for the architecture and decorative work of the exterior, while at the same time it is adapted in a most practical manner to the peculiar requirements of the situation.

The building faces the river, from which it is separated by a spacious and shady garden, while in the rear it rests somewhat upon the gentle incline here formed by the mountain bounding the northern side of the valley. The principal entrance of the north facade, in the first story, thus opens on to a large space of ground, partly paved with large stones, to which leads a road, which is properly a branch of the high road through the valley, but which is used in summer by all the diligences; this road afterwards divides, one branch of it leading back to the high road by gentle ascents, and the other leading through the covered bridge over the Inn and up to Vulpera. above these two roads winding along the face of the mountain in the rear of the Hotel, and placed terrace-wise one above

the other, we find, on ascending somewhat higher, that small pleasure-grounds have been laid out on the declivity, paths having been constructed and resting-places provided.

On the ground-floor of the principal building are the apartments for the use of the guests, all of which face the south. To the left of the south entrance is the billiard and smoking-room and the restaurant supplied with numerous English, French, German and Italian newspapers and magazines; while to the right is the ladies' saloon with piano, and reading-room adjoining.

On the first floor, visitors entering from the high road on the north side first reach a spacious entrance-hall, on the east-side of which stands the porter's-lodge and on the west-side the post and telegraph office, together with the directors' offices. This hall frequently forms a gathering-place for the guests assembled at the baths. In the west wing we find the magnificent dining-saloon, which is furnished with ventilating apparatus and occupies the entire length of the wing, being equal in height to two stories. Its ceiling of Cembran pine-wood

is handsomely decorated in the Renaissance style. Below the dining-hall are the domestic offices; also the office of the hotel-manager. The basement of the east wing is occupied by the baths, which are arranged in two stories, those of the upper story or "first class" being more elegantly appointed and more conveniently situated, and therefore higher in price, than those of the lower story or "second class". To the right, near the entrance to the first class baths, and on the right hand upon entering from the garden through the side-entrance, is the chief bathing-office, (open from 7. a. m.), where the fee for drinking waters must be paid and tickets for each bath taken.

The remaining portion of the building is occupied by 170 dwelling-rooms with about 200 beds (not including those required for servants). All these rooms are well furnished and some of them even luxuriantly. Private sitting-rooms may be had separate from the bed-rooms, or one may choose large, airy, and well-appointed rooms with the bed in a recess or alcove. The sitting-rooms in the chief building are

furnished with balconies on the side fronting the garden. Each floor is intersected by a broad and lofty corridor continued through the entire length of the building.

Nor have the sanitary requirements been neglected. Within a few years the entire sewage and drainage system, both of the Hotel and of the Villa, has been thoroughly reconstructed and improved. Water-closets are to be found in sufficient number on each floor, and are constructed upon an excellent English system (Jenkin's Patent).

Not far from the west wing, at the west end of the garden, stands the Villa Kurhaus Tarasp, erected in 1876 as a dependence to the grand hotel. This villa was built after plans by Herr Director Simon, of Ragatz, and was intended to remedy the inconvenience experienced in consequence of the insufficient accomodation afforded by the hotel. It is specially suited to such visitors as are desirous of greater quiet and repose than are to be found among the numerous throng of guests assembled in the main building. The interior appointments of the various apartments here are at the same time luxurious and comfortable.

The first and second floor each contain two large and convenient suites of apartments, with from six to eight beds; each suite comprising a sitting-room and from four to five bed-chambers, and being so arranged that a family may take a separate and consecutive suite of apartments. In the third story are the rooms appropriated to the use of visitors' servants and also some single bed chambers. The centre of the building is occupied by a large and handsome court, roofed with glass, into which the doors of all the rooms open. At the south-east corner of the Villa there is an octagonal projection the cosy sitting-rooms of which afford a beautiful view of the garden, the river flowing swiftly below it, and, in the western horizon, the bold and rugged pyramids of the Lischanna group. The poultry-yard which formerly was in the rear of the villa has recently been removed to a distance.

Although the gardens were only laid out at the time the baths were erected, they have quickly developed; the climate being, in spite of the great elevation, favourable to vegetation. The grounds are remarkably shady and sheltered from the wind, and

possess also stately avenues and delightful leaf-covered arbours. Between the garden and the south-facade of the Kurhaus there is a large open space, much frequented as a promenade both by day and in the evening. Opposite the main entrance on the south side a tastefully constructed fountain projects a jet of water to a height of forty feet, while the falling spray imparts a delightfully refreshing coolness to the surrounding atmosphere. In one of the two pavilions the orchestral band gives frequent rehearsals. Amusement is further provided in the shape of a Russian skittle-alley, and the requisite space for croquet and lawn-tennis is not wanting. To the south the garden is bounded by an embankment of the River Inn, and next it to the south-east stands the *Engine-house*, in which are placed the engines which serve on the one hand to pump the alcalo-saline and the acidulous-chalybeate water from the springs into reservoirs for the Baths, and on the other hand to provide for the most practicable heating of the baths by means of a special apparatus which will be hereafter described.

A covered wooden bridge near by leads across the River Inn to a symmetrical building upon the opposite bank, the so-called *Carola-Gebäude*. Here we find the *Carola-Quelle*, an iron-spring which takes its name from the present Queen of Saxony, who derived great benefit from its waters. It is now used exclusively for bathing purposes.

Close to the bridge is the entrance to the *Bazaar Stöckenius*, a branch of the business of the same name in Schuls. Next to it on the south side stand two other shops, one of which is occupied by the hair-dresser, who also places himself at the service of visitors in the Hotel itself.

The last door on this side leads to the English Chapel, in whose plain but suitable interior the English Church Service is at times performed. As, however, the number of the English visitors increases year by year, the present accommodation will soon be insufficient, and it is therefore highly desirable that the necessary funds be at once collected for the erection of an English church in some convenient and suitable spot in the neighbourhood of the Baths.

Continuing our walk past this building and up the river, we reach in a few minutes a small grove, which has been converted into a pretty natural park by the construction of many winding paths, partly on level ground and partly more or less ascending, and by the judicious distribution of numerous benches which afford welcome resting-places to the wearied invalid.

Turning to the right after crossing the bridge, a few steps bring us to the magnificent "Trinkhalle", (Spa-Building), which stands between the rocky wall of the valley and the turbulent river. The building was erected in 1875 and 1876 after designs by Herr Simon, proprietor of the Baths of Ragatz, who has succeeded admirably in adapting his architectural conceptions to the local circumstances and the limited area available.

We next pass through the first entrance which presents itself to us in the western façade and find ourselves in a promenade, 300 feet in length, and forming a verandah enclosed by glass windows looking out upon the river, while the opposite side is occu-



Trinkhalle Tarasp.



pied by a row of tastefully arranged shops, in their midst the semi-circular orchestra for the use of the band. Near the entrance, to the left, is the office of the superintendent of the Baths; here tickets may be purchased at an early hour in the morning (from 6 till 7 a. m.) by those desirous of drinking the waters. At the further end of the promenade a flight of eleven steps leads us to an antechamber with semi-circular recess and thence to the Rotunda, a building 66 feet in height, decorated with stucco-work and surmounted by a cupola. In this Rotunda rise the two principal springs of the district, the Lucius-Quelle and the Emerita-Quelle, boiling up into the marble basins constructed to receive their waters. On a table near at hand stand freshly filled bottles containing the waters of the iron-springs of Bonifacius, Wyh and Sotsass. On the wall of the antechamber we notice an inscription from the pen of the well-known German novelist, Dr. Berthold Auerbach, long a regular visitor of Tarasp-Schuls.

The verse runs as follows:

Die Alpenluft voll Heileskraft,
Heilkräft'ger Quell im Grunde,
Vereint ein neues Leben schafft;
So athme, trink', gesunde!*

In the Rotunda itself, a wooden structure divided into numerous small compartments stands immediately in the rear of the two springs; this serves as a receptacle for the drinking-cups of the guests, each of whom has a particular glass appropriated to his use during the whole term of his visit. In the centre are a clock and a date-rack, also a basin plentifully supplied with pure water for rinsing the glasses. On the wall behind we read the punning and very appropriate Latin inscription: "*Aere, sale, salus aerea*".

The necessary apparatus for warming the mineral water, should its temperature be too low, is also at hand.

The two springs, on the right the Lucius-Quelle, on the left the Emerita-Quelle, are named after the two principal saints of the Grisons, the celebrated British king

* The mountain air with healing fraught,
A spring that strength doth give,
Combined renew both life and health;
So breathe, and drink, and live!

Lucius and his sister Emerita. After founding several churches in England they renounced their royal state and journeyed to Coire, where they built the chapel now known as the chapel of St. Lucius and devoted their lives to the work of spreading the gospel among the heathen inhabitants of the Grisons.

The same building also contains store-rooms and the necessary appliances for exporting the mineral waters.

Between the Trinkhalle and the river there is a broad road or quay, furnished with an iron balustrade; this road brings us to a shady pine-wood, through which various paths lead to Vulpera and Schuls.

The Kurhaus Orchestra performs three times a day: from 6 to 8 in the promenade of the Trinkhalle; in the afternoon and evening in the garden, when the weather is favorable, otherwise in the Kurhaus-Hotel itself.

The stable and coach-houses are on the same side of the river as the Kurhaus, but a little further to the west, towards Ardetz; visitors desiring it, may here obtain milk of excellent quality.

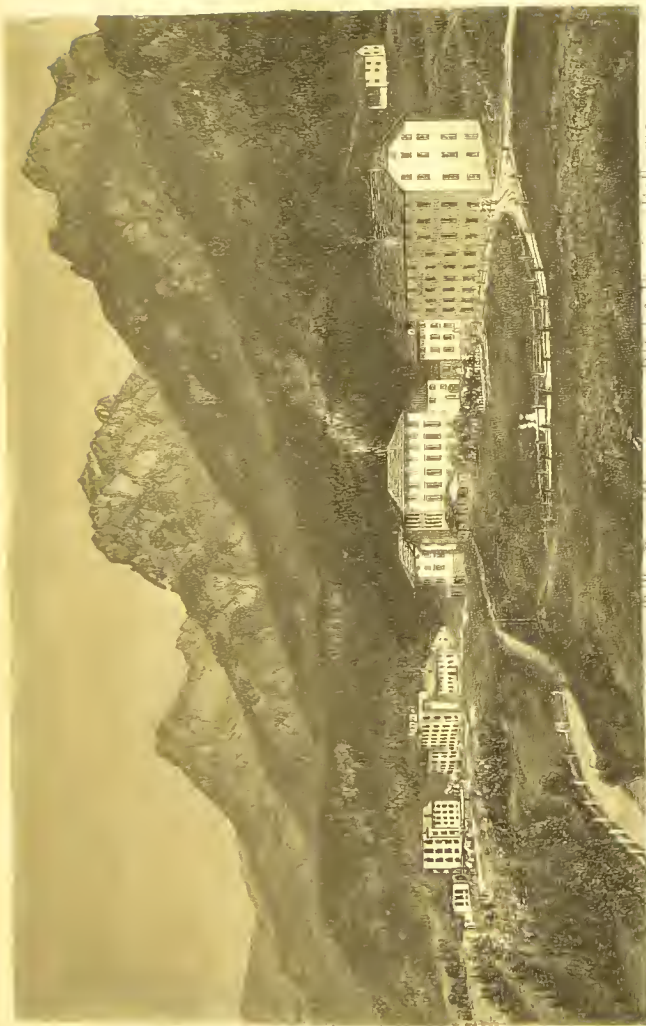
Private carriages for excursions are on hire; the tariff of fares may be inspected at the Hotel.

B. Vulpera.

(4183 feet above the sea.)

From the covered bridge over the Inn already described, a road, constructed by the Kurhaus Company, winds up the mountain side to the hamlet of Vulpera, situated on a sunny and open plateau of meadowland, at a height of 295 feet above the Spa-building.

The narrow strip of land, covered with luxuriant grass and meadow flowers, is enclosed on three sides by dense and fragrant pine-woods. The village is finely situated, and magnificent views are afforded in every direction, embracing a great variety of pleasing and sublime scenery. The verdant pastures at our feet soon give place to a chain of gracefully formed hills, increasing in height with the distance; while behind the dark pine-groves which crown their summits, rises the serrated pyramid of the Piz Pisog. Beneath us is the dark and



Pens Hotel, Pens Alpenrose Hotel & Pension Bellevue
Vulpera.



wooded ravine of the Inn, and opposite, in pleasing contrast, lie the sunny fields of the northern side of the valley, with the stately villages of Fettan, Schuls and Sins. The hamlet consists almost entirely of hotels and boarding-houses, with a few rustic dwellings interspersed. It is divided into two groups of houses, distinguished as Inner and Ausser Vulpera. Inner Vulpera is the nearest to the Spa. The road leading up from the Kurhaus here makes a sharp curve and continues as far as the village of Tarasp-Fontana. This group of buildings comprises the Bellevue Hotel (Messrs. J. Fanconi & Co., proprietors), and the Pensions "Vanos", "Alpenrose", "Tell" and "Conradin", together with several cottages which afford accomodation to many of the country people from the Tyrol who frequent the Springs; there is also a small Roman Catholic Chapel, in which morning service is frequently performed. Between the Pensions Alpenrose and Tell is the Post and Telegraph office.

A narrow but well-kept road leads from here to *Ausser Vulpera*, which consists of no more than seven or eight houses, among

them the "Hotel Steiner" and the „Pension von Moos", both of which have recently been enlarged. A path leads directly down the face of the mountain through the wood from Ausser Vulpera to the Spa Building and affords quicker communication with the Springs.

Before the erection of the Kurhaus, Vulpera was the principal resort of the visitors to the Springs, nor has it yet lost its air of rural simplicity and freshness. The hotels and boarding-houses afford tolerable accommodation, but are somewhat behindhand with respect to comfort and elegance.

C. Schuls.

Schuls is situated on the high road, at a distance of about $1\frac{3}{4}$ miles from the Spa Building and the salt springs. This village, called in the Romansch tongue *Scuol*, has a population, according to the census of December 1st 1880, of 915 inhabitants, and stands, with its long row of houses, on the gently sloping plateau in which the sunny precipices of the Piz Minschun and the Piz Champatsch descend to the banks

of the River Inn. The village is surrounded by waving fields of rye and barley and by luxuriant pasture-lands reaching far up the mountain side and spangled with flowers of a thousand hues. In spite of the considerable elevation, 4000 feet above the sea-level, apple, pear and other fruit trees flourish in the trim gardens surrounding the houses, and even a few straggling poplars may be discovered. The stately village is divided into two parts, known as Ober and Unter Schuls.

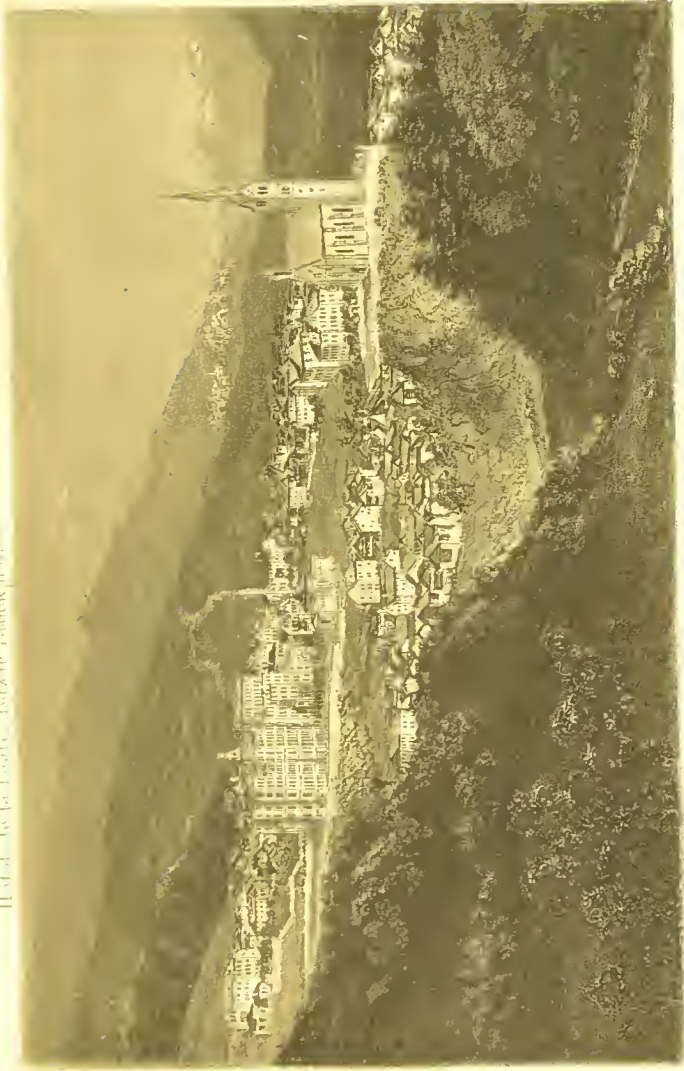
Ober Schuls, 4088 feet above the sea, (Romansch *Vih*, from the Latin *vicus*, village, hamlet), is situated at the entrance to the Chloza Tobel or Gorge, which is crossed by a bridge. The recent erection of several fine hotels and modern residences has greatly contributed to the embellishment of the village, which is intersected in its entire length by the high road, on which, on the side next the Kurhaus, stands the Hotel and Pension Belvedere, a modern building of tasteful design, its interior, especially the reception rooms, being excellently arranged. Close by stands the Hotel de la Poste, in which will be found the Post and Telegraph

Offices; since 1880 a station for meteorological observations has also been established here. This post-office is the starting-place of the public stage-coaches for the Upper Engadine, Davos and the Tyrol. At a little distance, to the left of the high road, and abutting on the slope of the mountain, stands the Hotel Schuls. Less pretentious hostelries are the Hotel zum Piz Champatsch at the entrance to the village, somewhat higher up on the mountain-side, on the road to Fettau, and the Krone Hotel, on the high road, on the opposite side of the Chloza Tobel.

From the high road itself, as well as from the more elevated parts of Ober-Schuls, we enjoy a charming view of the chain of gigantic dolomite mountains to the south, interrupted only by the canon of the Scarlthal, with its perpendicular rocky walls, behind which rises the magnificent pyramid of the Piz Foraz (10,151 feet), while to the west our eye rests upon the emerald-green plateau of Vulpera and the imposing Castle of Tarasp, perched upon the brow of a precipitous rock.

In the first house on the left, on the

Hotel de Ville, London
Hotel de Ville, London



Hotel de Ville, London, the View, Sejm



high road from the Kurhaus, the chemist has his abode, while in the first house on the right we find a photographic studio and a goldsmith's and watchmaker's shop. On the left of the high road, behind the Hotel de la Poste, is the large Bazaar Stöckenius.

Between Ober and Unter Schuls stands, in the midst of an even meadow, the handsome newly-erected Badehalle Schuls. Here the water of the Wyh-Quelle, an iron-spring strongly impregnated with carbonic acid, is obtainable, and excellent steel baths may also be had.

Unter Schuls, 3970 feet above the sea (Roman *ch Praem*, contracted from the Latin *Pratum Oeni*, Meadow of the Inn) is built along the left bank of the 'Inn, a new covered bridge leading from it across the river to the right side of the valley. On a steep eminence near the river stands the newly restored church of the village, surrounded by the churchyard. Just below the new bathing house is the old Pension Belvedere, belonging to the proprietor of the Hotel Belvedere and possessing a beautiful and shady garden. In the middle of the village

stands an old inn, the Hotel Helvetia. A footpath leads from Unter Schuls, and from the high road in Ober Schuls, through fields and meadows to that point in the river, where the wild and boisterous Clemgiabach, descending from the Scarlthal, joins the Inn. A narrow bridge enables pedestrians to regain the right bank of the river, and following this we soon find ourselves once more at the Spa Building.

We have yet to mention two places, which, although scarcely in the spa district which we are describing, are rapidly coming into favour as *climatic health resorts*, namely Fettan and Tarasp Fontana.

D. Fettan.

Fettan is situated at an altitude of 5404 above the sea and 1516 feet above the Kurhaus; its population numbered, at the last census, 523 souls. It is built upon a broad and extensive terrace resting upon a spur of the Piz Minschun. Its situation is delightful in the extreme, the village standing in the midst of luxuriant pastures and fruitful cornfields, bordered by shady



Vettan

groves of fir and pine. It affords a magnificent view of the snow-capped mountain-range to the south, while a prospect of unusual beauty is presented by the entire plateau of Tarasp and Vulpera, with Schuls peeping out of the valley beneath, and the village of Sins appearing in the distance.

The Hotel and Pension Victoria, in the middle of the village, offers the best accommodation to visitors. To the west a road brings us to Ardetz and towards the east a second road leads down to Schuls.

E. Tarasp-Fontana.

(4597 feet above the sea.)

Tarasp-Fontana is the principal village of the Roman Catholic parish of Tarasp, and forms, with its dependent hamlets and outlying houses, among the former being Vulpera, the only Roman Catholic community in the Engadine. The inhabitants number about 350. The village is connected with the Kurhaus Tarasp and with Vulpera by a good road. The situation of the village is attractive and highly picturesque. On the summit of an almost inaccessible rock stand

the majestic ruins of the former castle of Tarasp, its partially fallen battlements mirrored in the clear and placid water of the lake at its foot. On the shore of the lake stands the newly-erected Hotel and Pension Tarasp, while close at hand is the peaceful Capuchin Convent, surrounded by flourishing gardens enclosed by lofty walls. Behind this is the ancient church, environed by a group of irregularly-built cottages. At intervals among the verdant pastures and fields of golden grain are scattered the remaining hamlets and farm-houses, frequently surrounded by charming groves. The beautiful landscape is completed by the serrated summits of the Piz Pisog, Piz Zuort, and the two Piz Plafnas, while across the valley a charming picture is formed by the village of Fettan, the Minschun group of mountains, and the Piz Champatsch, and between them the snow crowned peak of the Fatschalv.



IV. The Climate and its Influence.

The circumstance that the alkalo-saline springs of Tarasp-Schuls are situated at a greater altitude, and are at the same time more copious, than any similar springs to be found on the continent of Europe, renders desirable an enquiry into the climatic conditions here met with. In discussing the benefits derived from a visit to Tarasp-Schuls, the important and powerful effect of climatic influences must naturally be taken into consideration, and in our opinion it is beyond question that a large portion of the beneficial results experienced, may rightly be attributed to the magnificent mountain climate.

A. The physical properties of the Climate.

By *climate* we understand the sum of the influences which the quality of the soil, its elevation and geographical position, in conjunction with atmospherical influences, exercises upon the development and life of

organic beings. The climate of a given place, the total product of all the enumerated factors, is merely the result of very nearly related and closely connected effects of the single factors; these factors, however, we are compelled to describe separately.

We have already, in the foregoing chapters, given a detailed description of the geographical position, the topography and the geology of the district; we therefore proceed at once to a discussion of its atmospheric influences, namely to a consideration of the density, temperature, moisture, purity and disturbances of the atmosphere as well as of its electrical and optical conditions, merely premising that we must here confine ourselves to a consideration of the state of the atmosphere in the four summer months, from June to September.

The average elevation of the district above the level of the sea being 4000 feet, the stratum of air above it is 4000 feet less in thickness, and the atmospherical pressure is also less. For the same reason the periodical variations of atmospheric pressure are less and the air is naturally comparatively rarefied. According to observations made by

Dr. Killias for a long series of years in the Kurhaus Tarasp, and kindly placed by him at our service, the mean height of the barometer there during the summer season is 25.75 inches.

The mean summer temperature, 57.53 Fahr., is very moderate and must, in consideration of the altitude, be regarded as extremely mild. According to Dr. Killias, the average mean and extreme summer temperature during the season embracing the period 15th June to 15th September, in the sixteen years from 1864 to 1879, is as follows:

Mean temperature of the season.			
	Mean.	Lowest.	Highest.
June . . .	56 ⁰ .8	37 ⁰ .4	80 ⁰ .8
July . . .	60.2	41.9	87.1
August . .	58.4	37.4	82. —
September .	54.7	34.3	78.8
Season	57.53	34.3	87.1

The observations in the Kurhaus Tarasp do not extend over the entire months of June and September, but a comparison of the mean summer temperature of the Lower Engadine, as recorded at the neighbouring station of Remüs (135 feet above Tarasp)

for the four years 1864—1867, with the two fashionable summer resorts of Klosters, in Prättigau, between Landquart and Davos, and Churwalden near Chur (both being at an equal altitude with Tarasp) on the one hand, and on the other hand with the favourably situated station of Sils-Maria in the Upper Engadine yields the following result:

	Remüs	Klosters	Chur- walden	Sils-Maria
	4023'	3954'	3977'	5939'
June .	57°.1 F.	54°.0 F.	52°.2 F.	49°.8 F.
July .	59. 7	58. 7	58. 9	52. 6
August	57. 6	55. 9	56. 2	50. 0
September	54. 4	53. 1	53. 7	46. 7
Season	57. 2	55. 4	56. 0	49. 8

The observations of the Swiss Meteorological Commission* show that in the Julier Group the temperature decreases in summer in the ratio of 1° Cent. for 165,2 metres of altitude, or 1° Fahr. for 300 feet. It follows from this that Sils-Maria, at an elevation of 1916 feet above Remüs, should show an average temperature of only 6°.3

* Lombard, Traité de Climatologie médicale, 4 vols. Paris 1877—1880.

Fahr. less than Remüs. The summer climate of the Lower Engadine, in comparison with the Upper Engadine and with stations at the same altitnde or a little lower, is both relatively and absolutely warmer and milder. The narrow and gorge-like formation of the valley of the Lower Engadine diminishes the effec of the sun's heat during the daytime in comparison with broader valleys; but although the air becomes thus less heated during the day, the same cause tends to diminish the radiation at night. The influence of the neighbouring Southern Tyrol and the position of the valley, entirely protected against north and north-west winds, also helps to raise the temperature. The character of the vegetation, quite unusual at such an altitude, including deciduous forest trees and various species of fruit trees, as well as the richly diversified flora, also bears witness to the mildness of the climate.

The climate of the Lower Engadine is nevertheless of an unmistakably Alpine character, as is proved by the extremes of temperature at Tarasp-Schuls given in the table, and by the mean daily range of

temperature, which here amounts to 14—16° Fahr., this being, however, much less than the frequent great variations experienced in the Upper Engadine.

The absolute moisture, that is, the amount of moisture contained in a given quantity of air, is diminished in proportion to the great elevation of Tarasp above the sea.

The relative moisture, or the proportion of moisture contained in a given space to the complete saturation of the same, yields — inclusive of the morning and evening observations — a daily mean of 60—70 per cent, while the mean of the midday observations which alone is of importance from a climato-therapeutic point of view is no more than 55—56 per cent. In this respect, therefore, the atmosphere of Tarasp-Schuls, according to Dr. Weber's* division, occupies the border-line between "very dry" and "moderately dry", but never shows such extreme degree of dryness as the Upper Engadine.

In regard to the yearly rain-fall, the Engadine, and more especially the Lower

* Dr. Hermann Weber, London, *Climatotherapie*. Ziemsen's *Handbuch der allg. Therapie*, Vol.II, Prt. I. Lpzg. 1880.

Engadine, furnishes a very interesting exception to the general rule. While a comparison of the rain-fall of 96 Swiss stations for a period of four years gives 57.5 inches as the annual average at 25 of the more elevated stations, Remüs shows an annual rain-fall of only 28.8 inches, — a circumstance which may easily be explained by the E. N. E. direction of the valley and the mountain ranges, warding off the north and west winds.

If we include in the number of rainy days all those on which rain falls, however inconsiderable the *quantity*, then Tarasp-Schuls shows a great number of rainy days during the season, but as a rule the showers are of short duration, frequently being accompanied by thunder, and there are but few days in which visitors are unable to enjoy the fresh air. These frequent showers tend, moreover, to freshen and purify the atmosphere.

Taking 10 to represent a sky completely overcast and 0 to represent a cloudless sky, the average state of the sky here is represented by 5.5. Fog is scarcely ever observed in the valley.

The prevailing winds are the south-west and north-east winds, the direction of the valley affording these the easiest access. The huge Silvretta Group protects the valley against the north and west winds which prevail in most regions during the summer. The *Thalwind* (*vent de plaine*) blows here up the valley, and not as it does exceptionally in the Upper Engadine, down the valley. The *Bergwind* here attains no great force, owing to the lack of glaciers and snow fields on the sides of the mountains facing the valley. Fettau and Schuls, and in particular the Kurhaus Tarasp, occupy extremely sheltered situations.

The effect of solar radiation is undoubtedly increased during the summer in the rarefied and almost vapourless atmosphere of our elevated valleys. The observations of Dr. Volland*, which seem to prove the contrary, do not justify the conclusions drawn from them, since the atmospheric strata of the lowlands, rich in vapour, and therefore bad conductors of heat, maintain

* Dr. Volland, Ueber Verdunstung und Insolation. Basel 1879.

the so-called dark radiation of the earth's surface longer, for which reason the maximum of solar radiation can only be used in comparisons after deducting the then prevailing temperature in the shade. In spite of the intense power of the sun's rays, the atmosphere of the elevated valleys remains cool, since according to the experiments of Tyndall and Frankland the air, which is usually very dry, easily permits the passage of the heat-giving rays, and is thus but little raised in temperature. The remarkably intense colours of our plants lead to the conclusions that the influence of the chemical or actinic rays is increased.

The purity of the atmosphere, which forms such a very important property of the mountain-winter, is not to be found during the summer in the elevated valleys, the protecting mantle of snow being wanting. The atmosphere, however, is here much purer than at lower levels, in consequence of the absence of organic impurities.

We will conclude the physical consideration of the climate with the well-chosen

words of Dr. Sedgwick* in his pamphlet upon Tarasp: "In brief, then, it may be said of the climate of Tarasp, that, while retaining the sunshine and the bracing and inspiring properties of higher Alpine situations, it is milder and less irritating, from its greater moisture, its greater warmth, and its greater equability".

B. The Therapeutic Effects of the Climate.

The oxygen in the atmosphere decreases with the increasing elevation above the sea and with increasing temperature. According to Lombard in his work already referred to (Vol 1, page 267), the atmosphere of Tarasp-Schuls, at an elevation of 4000 feet and with its average summer temperature of 57° Fahr., would contain in the summer only about six-sevenths of the oxygen contained in the air at the sea level at a like temperature. From this deficiency of oxygen, Bert, Jourdanet, Lombard and others have deduced a greater

* L. W. Sedgwick, M. D. Tarasp: Its Mineral Waters and its Climate, London. J. & A. Churchill. 1872.

desire for oxygen with consecutive constitutional anæmia on the part of the inhabitants of elevated regions. This is, however, a very deceptive conclusion. On the one hand physiology teaches that under ordinary circumstances scarcely 25 per cent. of the oxygen contained in the atmosphere of the lowlands is needed for respiration, so that even in the most elevated health resorts the air contains much more oxygen than is absorbed by the blood, and it also teaches that the absorption of oxygen by the blood is independent of the physical laws governing the diffusion of gases, and that it only takes place in consequence of the affinity of the hematine — the colouring matter of the blood, contained in the red blood corpuscles — to the oxygen. On the other hand the experiments of Tyndall and Frankland demonstrate the increased activity of the oxygen molecules at great elevations. Every visitor who will but observe the inhabitants of the Engadine may easily perceive that they do not suffer in the least from imperfect respiration, *diète respiratoire*, or constitutional anæmia.

The expiration of carbonic acid, on the

contrary, is absolutely increased in the rarefied atmosphere of mountains. The observations of Dr. Marcet* have confirmed the (from a therapeutic stand-point) important increase of the expiration of carbonic acid at great elevations.

Numerous hypotheses have been originated with the object of referring all the effects of the Alpine climate to the diminished atmospheric pressure. The comparatively unimportant effects of the rapid change of air experienced in balloon ascents, and the possibility of a continued stay in the dense atmosphere of the diving-bell, give evidence of the ease with which organisms are able to accomodate themselves to a variation in the atmospheric pressure. It is almost universally believed that a diminution in the pressure of the atmosphere causes an increased flow of blood to the skin and pituitary membranes, thus involving a change in the distribution of the blood, but the cardiagraphic and sphygmographic measurements necessary to prove this are wanting. All such theoretical attempts at explanation are to be regarded with distrust until

* Proceedings of the Royal Society. London, 1879.

physiology shall furnish us with more positive information as to the reflex centres, and their mode of operation under varying influences.

A further very important factor is the low relative and absolute moisture of the atmosphere. The dryness of the air increases evaporation, and this promotes greatly the perspiration of the skin and the evaporation from the lungs, while at the same time the loss of heat by the body becomes greater. The action of the skin is also increased by the greater solar radiation, and the skin is thus gradually strengthened and fortified against changes of temperature.

The frequency of the pulsations of the heart and of the respirations are increased only in the beginning of a visit to the heights, and gradually resume their normal speed, but it is probable that the strength of the single contractions of the heart and the depth of the single respirations are at the same time increased.

All these influences combine to increase the appetite both of the healthy and of the sick, — of such of the latter at least, as are still capable of resisting disease. In

the case of healthy persons, however, as we have personally observed, the appetite soon returns to its usual state; "In the case of invalids the increase in the amount of nourishment taken leads at once to the improved sanguification and nutrition of the organs and thus to a more lasting need of nourishment, combined with an increased power of assimilation"* , so that their appetite remains permanently greater than it was in the lowlands. Digestion is thus promoted, the action of the bowels increased, the entire change of tissue rendered more rapid, and the activity of the nerves and muscles heightened. In the case of corpulent persons the more rapid change of tissue results in a decrease of the fatty tissues. It is probable, too, that the greater solar radiation exercises a direct influence upon the nerves, while at the same time the bracing atmosphere and the natural beauties of the scenery elevate the soul, enthrall the senses and tend to divert the mind from brooding on past cares. The magnificent and varied surroundings and the greater ease of movement lead to a

* Dr. Herm. Weber, *Climatotherapie*; p. 136.

more frequent exercise of the muscles and thus promote their more rapid acquisition of strength.

Before turning our attention to the various groups of maladies in which Tarasp-Schuls and the neighbouring spots will be found of service as climatic health-resorts, we again briefly call attention to the fact that Tarasp-Schuls is distinguished by the mild and equable character of its climate, so that it may be recommended even to such as stand in need of a temperate climate. The climate of the Upper-Engadine, the most elevated Alpine valley in Europe, is more liable to sudden and important changes in temperature and is therefore still more stimulating and bracing in its effects, provided the patient possesses the necessary power of resistance. It is therefore a great advantage for Tarasp-Schuls that the loftily situated health-resorts of the Upper-Engadine, — Sils-Maria, St. Moritz, Samaden, Pontresina and Zutz — may be reached in a few hours, and are thus easily available for the completion and corroboration of the cures effected by the climate and the mineral waters of Tarasp-Schuls.

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Dr. Burney Yeo* thus speaks of the relation between these climatic health-resorts: "Schuls and Vulpera offer excellent resorts for those who need less decidedly bracing treatment than is to be found at St. Moritz, while they also afford convenient intermediate resting-places for those delicate and sensitive persons who may desire to avoid either a too sudden approach to, or a too sudden descent from, the rarefied air of the Upper-Engadine".

The climate of Tarasp-Schuls will be found beneficial in the following diseases:

I. Chronic Diseases of the Digestive Organs.

Dyspepsia and atony of the stomach in persons accustomed to a sedentary life, in hypochondriacs and anæmics; also the so-called nervous dyspepsia and gastralgia; chronic catarrh of the bowels, whether in conjunction with stagnation in the portal system, hemorrhoids, or weakness of the skin, or arising from general diseases of nutrition, such as corpulence, chlorosis, etc.; enlargement of the liver and spleen.

* "Sea or Mountain?" Fortnightly Review. Vol. CXII, N. S., p. 216. 1877.

II. Chronic diseases of the Respiratory Organs.

Chronic catarrhs of their mucous membranes with increased secretion of mucous matter; nervous bronchial asthma; disposition to, and incipient stages of, pulmonary consumption (for these Fetta, Vulpera and Tarasp-Fontana, with their neighbouring pine-groves, are highly to be recommended); remainders of pleuritic exudations.

III. Diseases of the Nervous System.

Neuralgia accompanied by anæmia; sleeplessness arising from over-work, and unaccompanied by mental excitement.

IV. Constitutional Diseases,

such as scrofula and rickets, chlorosis and anæmia. In particular, the effects of a prolonged stay in tropical regions or of malarial influences. Diabetes.

V. Convalescence from severe Illnesses,

for recovery of important loss of strength, for example after malignant typhus, dysentery, great loss of blood, and prolonged suppurations.

On the other hand a visit to our valley

is prejudicial in the following cases: extreme debility with defective power of resistance; psychic affections with tendency to excitement; too far advanced emphysema or chronic bronchial catarrhs accompanied by considerable dilatation of the bronchial tubes; convalescence from acute rheumatic fever. In organic diseases of the heart, however, the climate is by no means so prejudicial as is frequently maintained. In many cases, in which there is but a moderate dilatation of the heart, and especially in numerous instances of fatty degeneration of the heart, where the weakness of the muscle of the heart is not too far advanced, we have observed speedy and decidedly favourable results of the climate.

With regard to the peculiarities of climate of the various localities of our health-resort, we would next remark that the Kurhaus Tarasp-Spa, with its southern aspect and deep situation, protected on every side, enjoys on the one hand almost perfect freedom from wind, while on the other hand the swiftly flowing river close by effects the requisite motion in the atmosphere. The shady garden of the Kurhaus

itself and the neighbouring woods upon the opposite side of the valley, converted into natural parks, afford the guests cool and delightful retreats even during the hottest summer days and the Kurhaus offers great advantages to visitors in unfavourable weather.

Vulpera on its more elevated and open plateau, faces the north, and has undoubtedly a mean temperature of one or two degrees Fahrenheit lower. Besides the magnificent prospect it affords, it enjoys the great advantage of being immediately surrounded by woods, while its more free and open situation renders it more exposed to the winds. Tarasp-Fontana, occupying a situation of extreme picturesqueness, also faces the north and is still more exposed, the woods being remoter, but precisely on account of its loftier position and bracing climate it is entitled to consideration. Schuls, facing the south and lying in a horse-shoe shaped hollow, is tolerably protected from the wind and enjoys plenty of sunshine, but is unfortunately deficient in shady groves and walks, which can only be found at a considerable distance on the

further side of the river. Fettau, 1316 feet higher, and likewise tolerably sheltered, faces full south, while the extensive terrace on which it is situated affords opportunity for numerous pleasant walks both on the level ground and on the mountain side; it is quite surrounded by dense groves of fir and pine trees.

The soil is everywhere porous and permeable, so that the roads soon dry after rain and even in the lowest situations the water quickly flows off; the ground is therefore nowhere in the least damp. In the entire district there are no standing waters or marshes to be found. We now conclude our remarks upon the climate of Tarasp-Schuls, merely adding that the climate may generally be considered as co-operating with the springs, which we now proceed to treat of, and that therefore the excellent results of a visit to our health-resort may be attributed to the combined influence of its climate and its mineral waters.



V. The Mineral Springs and their physiological and therapeutical effects.



Nature has endowed the district, already so rich in beauties of scenery, in a most bountiful manner with health-giving springs of various composition. There is probably no other region in Europe which can show such a remarkable variety of mineral-springs within such a circumscribed area. In our district itself, its length scarcely three miles, there rise more than twenty springs, and if we include the springs of the Val Sinestra, behind Sins, the number contained in the narrow strip of land about $5\frac{1}{2}$ miles in length will be raised to more than thirty. Of all these springs only nine have been, up to the present, brought into general use, and we shall be compelled to confine our remarks to these nine. They may be divided into two principal groups, the alkalo-saline or Glauber's salt springs and the iron-waters or steel-springs, which are, however, subject to considerable variation

in their constituent parts. Besides these there is a third variety of mineral water in Tarasp-Schuls, represented by the sulphur spring of Val Plafna, near Tarasp-Fontana, but this has not yet been enclosed, and as is the case with the numerous *mofettes* or cavities exhaling carbonic acid gas and hydrothionic acid, its medicinal properties have not yet been turned to account. Outside of this district no mineral-springs are to be found, so far as known, for a long distance. All the springs used, rise, as mentioned in Chapter II, from the so-called *Bündner-Schiefer*.

A. The Alkalo-Saline or Glauber's salt springs.

This group comprises four springs. The two used for drinking purposes, the St. Lucius Quelle and the St. Emerita Quelle, contain a greater proportion of solid matter not only than the remaining two, but than all similar springs in Europe, and to them Tarasp-Schuls owes its extensive and well-founded reputation. Both rise on the right side of the valley, are enclosed in strong

basins of yellow marble and are surrounded by the magnificent Rotunda of the new Spa Building.

The Luciusquelle delivers a supply of $1\frac{1}{2}$ pints per minute, or 11 gallons per hour. Its water is clear as crystal and sparkles freely in the glass. Containing a large quantity of free carbonic acid, it possesses but a slight salt taste and has a pleasant pricking flavour. According to Professor Husemann* the temperature of the water (the temperature of the atmosphere being 68° Fahr.) is 44° and its specific gravity 1.012347.

The Emeritaquelle rises at a distance of but one yard from the Luciusquelle, contains fewer gas bubbles, and tastes therefore more of salt. The supply of water is one quart per minute or 15 gallons per hour. The temperature is likewise 44° Fhr. and the specific gravity 1.012308.

An inspection of the following analysis of the two springs plainly shows that the difference in quantity of all the constituents

* Prof. A. Husemann, "Neue chemische Untersuchung der Heilquellen von Tarasp". Neues Jahrbuch für Pharmacie. 1873.

varies only within the limit of unavoidable errors in the analysis, but that the chemical composition of the two is completely identical. The greater development of gas in the Luciusquelle merely shows that the unabsorbed carbonic acid present in the subterranean channels of water mostly finds an outlet through the Luciusquelle.

Table A. The Glauber's Salt Springs of Tarasp-Schuls.

Analysis by Professor Husemann, 1872.

In 16 Ounces = 7680 Grains, the Carbonates calculated as Bicarbonates	St. Lucius Spring	St. Emeria Spring
Sulphate of potash	2.916	3.090
" " soda	16.131	15.912
Borate of Soda	1.322	1.354
Nitrate " "	.006	.006
Chloride of sodium	28.216	28.308
" " lithium	.022	.020
Bromide of sodium	.163	.165
Iodide " "	.007	.007
Bicarbonate of soda	37.426	37.545
" " ammonium	.507	.504
" " lime	18.800	18.772
" " strontia	.005	.005
" " magnesia	7.524	7.563
" " protoxide of iron	.165	.163
" " protoxide of manganese	.002	.002
Silica	.069	.070
Phosphoric acid	.003	.003
Alumina	.002	.002
Barium, Rubidium, Cæsium, Thallium, Organic matter	traces	traces
Total amount of fixed matters:	113.289	113.492
Free and half-free carbonic acid gas, Cubic Inches	76.17	75.42
Quite free carb. acid gas, ditto	33.92	33.08

The two other Glauber's Salt Springs rise on the left bank of the Inn, within the boundaries of Schuls and nearly opposite the two already described. They are both precisely similar in composition and are almost identical with the springs of St. Lucius and St. Emerita, except in being somewhat less concentrated. They are known as the "Ursusquelle" (formerly called the Schuls Salt-water and in great request) and the copious "Neue Badequelle"; both are now used, together with the waste of the Lucius and Emerita Springs, exclusively for the Baths in the Kurhaus.

We have placed these springs, according to general custom, in the category of the alkalo-saline and Glauber's salt springs, they containing, together with a high proportion of free carbonic acid, large quantities of bicarbonate of soda, common salt and Glauber's salt. A glance at the foregoing analysis, however, will show that both the common salt and the soda exceed the Glauber's salt in quantity, so that these Tarasp springs might just as well be included in the soda or common salt springs, as will also be seen by the following comparative analysis:

Table B. Comparative analytical table.

In 16 Ounces = 7680 Grains Monocarbonates	Tarasp Luciusquelle	Glauber's Salt Springs		Common Salt Spring	Simple Soda Spring
		Carlsbad Sprudel	Marientbad Ferdinandsquelle	Kissingen Rakoczy	Vichy Grande Grille
Total solid matters	93.8	42.4	70.6	85.6	40.8
Carbonate of Soda	26.4	10.0	11.2	—	27.0
Sulphates of soda, magnesia and potash	19.0	19.9	36.6	4.5	2.3
Chloride of sodium	28.2	8.0	13.1	44.7	4.1
Carbonic acid gas, free and half free Cubic Inches	76.2	12.6	68.8	41.8	—
Carbonic acid gas, quite free, ditto	33.9	3.9	—	27.3	13.1
Temperature in Fahrenheit degrees	44 ⁰	164 ⁰ ₅	50 ⁰ ₅	51 ⁰ ₂	102 ⁰ ₅
Elevation in feet, about	4000	1200	1900	600	800
Analysis by	¹ 1872	² 1879	³ 1879	⁴ 1856	⁵ 1855

¹ Husemann, ² Ludwig, ³ Ginte, ⁴ Liebig, ⁵ Bouquet.

We see by this table that the proportion of carbonate of soda in our springs is nearly equal to that contained in the waters of Vichy. Of alkaline sulphates (Glauber's salt and sulphate of potassa) Tarasp has about the same quantity as Carlsbad, but far less than Marienbad. The amount of chloride of sodium most nearly approaches that at Kissingen. The amount of solid matters and of carbonic acid is greatest at Tarasp, which is also situated at the greatest altitude.

The important advantages thus afforded by Tarasp are freely recognised by all the chief writers on the subject as well as by the most celebrated medical authorities of Germany and Switzerland. As early as the fourth decade of our century the genial Schönlein visited Tarasp twice and introduced the Tarasp water in his practice. In 1848 the well known writer on balneology, Osann, declared the springs of Tarasp to be more efficacious than those of Carlsbad and Marienbad. In 1861 Lebert expressed the opinion that "Tarasp may best be compared with Kissingen and Carlsbad, and is one of the very best of known

mineral waters in diseases of the liver and stomach as well as in bowel complaints of various kinds."

Dr. Burney Yeo*, after making a minute comparison of the Tarasp waters with other springs, states that "there is scarcely a spring in Europe that is known to possess so many important qualities", and Dr. Hermann Weber remarks in his translation of Braun's *Handbuch der Balneotherapie*: † "Tarasp has only recently risen into fashion, though its springs have been known for centuries, and all circumstances combine to render it one of the most interesting and valuable spas. The springs contain the component parts of those of Carlsbad, Marienbad, Kissingen and Vichy; the amount of iron, in itself small, does not come into consideration in waters thus composed. The coldness of the water can place no hindrance on its universal use, because the great amount of carbonic acid allows of its being

* "Notes of a Season at St. Moritz and of a visit to the Baths of Tarasp". London. Longmans, Green & Co.

† Dr. J. Braun, "On the curative effects of baths and waters. An abridged translation, with notes edited by Herm. Weber, Mcd. Dr., F. R. C. P." London. Smith, Elder & Co. 1875.

warmed. In addition to this we may enumerate the advantage of its high situation, one of the highest for bathing resorts, the influence of the rarefied air in facilitating the change of substance and in rendering the necessary vital stimulus more bearable; further, combined with these a warm summer climate, and lastly, in contrast to the complicated social relations of Carlsbad and Marienbad the conditions of a simple existence, stimulated by the enjoyment of Alpine scenery."

In commencing the discussion of the effects of the separate constituents of the springs, we may properly confine ourselves to the various salts which occur in important quantities, and leave altogether out of consideration the constituents which are present merely in insignificant quantities or of which only traces can be found. We also leave out of view the iron and the borate of soda, although the quantity of the latter is by no means small, since, taking into consideration the much larger quantity of other salts with which it is associated, its effects cannot be important. There thus remain as prominent and effective constituents the

bicarbonate of soda, the common salt, the Glauber's salt and the bicarbonates of lime and magnesia, which, in conjunction with the very large amount of carbonic acid and the water, the common menstruum in which all the salts are dissolved, form the active principle of these mineral waters.

The drinking of cold water, at least of the low temperature of our Springs, excites the muscles of the stomach and intestines, stimulating the peristaltic action, and thus promotes digestion and acts as a mild aperient. The warming of the water in the stomach nearly up to blood heat is a source of loss of heat to the system, and according to Winternitz* temporarily lowers the temperature, lessens the number of pulsations and raises the pressure of the blood. The water is probably absorbed for the most part by the veins of the walls of the stomach, and in a lesser degree by the veins of the intestines, and thus passes primarily into the blood of the portal vein, for which reason the drinking of the waters often has a very rapidly beneficial effect

* Die Hydrotherapie auf physiologischer und klinischer Grundlage. Wien, 1880.

in cases of disturbed portal circulation and imperfect formation of the blood. Drinking the water in larger quantities promotes diuresis and increases the amount of urea, of chloride of sodium and of phosphoric and sulphuric acid in the urine. The secretion of bile is also increased and in this case also the quantity of solid constituents is absolutely raised. This shows the important effect of the waters in promoting the change of substance as well as in formation of blood. Universal experience teaches that the nearer the temperature of the water approaches that of the blood, the quicker it is absorbed by the veins of the stomach. Where, therefore, the object to be attained is less the stimulation of peristaltic action and the relaxation of the bowels than the most rapid and complete absorption of the salts it is advisable to raise the temperature of the mineral water to a proper heat. Many persons cannot take the waters cold without experiencing a feeling of oppression and an uncomfortable sensation in the stomach, and are compelled for this reason to have the water warmed.

Carbonic acid is another important and

very prominent constituent of our spring. Of the manner of its action but little is known, although numerous unsatisfactory hypotheses have been formed regarding it. The action of the carbonic acid upon the nerves of the tongue and the mucous membranes of the stomach creates a pricking sensation in the mouth, and in the stomach a feeling of warmth by stimulating the secretion and the peristaltic action. According to the trustworthy researches of Quincke* it further causes hyperæmia of the mucous membrane of the stomach, thus waters promoting the absorption of the greatly, and temporarily increases the volume and velocity of the stream of blood passing through the kidneys, largely increasing the secretion of urine during some hours. The large quantity of free carbonic acid, which amounts in the Luciusquelle to as much as 34 cubic inches to the pound of water, is in part quickly rejected by eructation and in part carried with the water into the intestines and thence ejected. The considerable quantity

* Archiv für experimentelle Pathologie und Physiologie. VII. Band.

of carbonic acid present in combination with the bicarbonates, and only gradually liberated in the stomach and in the intestines, and the effect of which is the same, must also be taken into account. The by no means unpleasant taste and the easy digestibility of the Tarasp Glauber's salt water, in spite of the abundance of solid matters contained in it, is to be attributed to the presence of carbonic acid in such large quantities.

The bicarbonate of soda is decomposed by the hydrochloric acid of the gastric juice into chloride of sodium and carbonic acid, which act like carbonate of soda and all alkalies in weak solution in promoting the peristaltic action of the stomach and the intestines and the secretion of the gastric juice, and thus operate as laxatives.

The greater part is neutralised by the acid of the gastric juice; any superfluity is absorbed by the blood itself. Even when all the carbonate of soda is converted into chloride of sodium, the amount of soda in the blood is, according to Leichtenstern*,

* Leichtenstern, *allgemeine Balneotherapie*. Ziemssen's *Handbuch der allgem. Therapie*. II. Bd. 1. Thl. Leipzig 1880.

increased: "For every atom of oxymuriatic acid liberated from the chloride of sodium of the blood in the gastric juice, to maintain the normal alkalisation of the blood an equivalent in carbonate or gallate of soda or albuminate of soda must reach the intestines. If no carbonate of sodium is taken into the stomach, not only is chloride of sodium formed and absorbed by the blood, but the quantity of carbonate of soda equivalent to the formation of oxymuriatic acid in the stomach and eliminated in the intestines returns likewise to the blood." This soda reaches the liver by the portal vein and is there possibly at once turned to account in the preparation of the gall, which perhaps explains the favourable effects of the alkalo-saline water in removing gall-stones as well as the action of a liberal use of the water in promoting the secretions. For the most part, however, the soda absorbed by the blood is quickly excreted again with the urine, and by neutralising the phosphate of soda it promotes a neutral or even alkaline reaction of the urine. Besides this, the carbonate of soda possesses diuretic properties.

Chloride of sodium or common salt taken into the stomach largely promotes the secretion of gastric juice. It further promotes the detachment of pepsine from the gland-cells of the stomach containing albuminoid matter and hastens the absorption of the peptone. By reflex it excites the peristaltic action of the stomach and of the intestines, and in large doses it acts as a powerful purgative. By reason of its great diffusibility it is for the most part absorbed by the stomach itself, and while, according to the researches of Voit, it accelerates the velocity of diffusibility of the capillary system throughout the parenchyma and thus exposes larger quantities of the circulating albumen to the splitting forces of the cells, it increases, in the form of urea, the excretion of nitrogen through the urine, and is of great importance in the solution of the albuminous matters in the blood. The reabsorbed chloride of sodium soon reappears in the urine and operates as a weak diuretic. According to Liebig, common salt plays a very important part in the formation of the organs as well as in the change of substance within the

tissues, and all researches tend to show that common salt taken in moderation exercises a beneficial influence upon the process of nutrition.

That sulphate of soda or Glauber's salt has a special influence upon the change of tissue was formerly the generally received opinion, this erroneous belief being based upon the researches of Professor Seegen, who assumed that Glauber's salt, taken in moderate doses, reduced the oxidation of albuminous matters in the body, but that it increased, on the other hand, the consumption of fat. Voit, however, has shown by later experiments that Glauber's salt acts in the same manner as other neutral salts in increasing the excretion of water and the destruction of albumen. Like the salts before mentioned, Glauber's salt largely increases the peristaltic action by irritation of the nerves of the stomach and intestines, and thus promotes a more rapid evacuation of the fluid contents through the intestines, and like those salts, too, it operates as a diuretic.

The bicarbonates of lime and magnesia are decomposed by the acids of the stomach

into hydrochlorates and lactates, and thus operate chiefly as a means of removing acidity. If more be taken into the stomach than can be decomposed by its fluids, the superfluity passes off unchanged along with the excrements. But while the carbonate of magnesia acts rather as an aperient, thus giving support to the effects of common salt and sulphate of sodium, the carbonates of lime seem to promote constipation. Further physiological effects of these two salts have been much discussed, but still lack proof.

The Tarasp springs being distinguished among all Glauber's salt springs by the greater proportion of solid particles contained in them, equally large doses of these waters will of course contain a considerably larger quantity of the above-mentioned salts. If we regard, according to general custom, one litre, or about 36 ounces, of the mineral water as an average daily dose, and base our calculations on the above-given detailed analysis of the Glauber's salt springs of Tarasp, we shall find that this quantity of water from the Luciusquelle contains nearly one and a half

drachms of bicarbonate of soda, one drachm of chloride of sodium, and two scruples of Glauber's salt. The tumblers used in Tarasp holding about six ounces, this quantity would correspond to six glasses per day, which, however, operates in such a manner that it must be regarded as the average maximum dose, and should only be exceeded in quite exceptional cases. Still the quantity of salt thus taken into the stomach will be far smaller than in the ordinary, but less effectual, pharmaceutical preparations. Concerning this Sir Henry Thompson writes as follow:* "Thus, for example, you know that you may give A an ounce of salts, or B half an ounce, and you purge them; but you may obtain the same effect with one-fifth of those quantities if you give it as prepared in Nature's laboratory in the form of mineral water. It is a curious fact, which I give as an ultimate one, and without speculating here on the cause of the difference."

What then are the therapeutical results which follow from the above-described physiological effects of the most prominent

* The Lancet. January 13th, 1872.

constituents of these waters? The Glauber's salt springs operate in three different ways:

1. The irritation caused by the coldness of the water drunk fresh from the spring, the bicarbonate of soda, the chloride of sodium and the Glauber's salt produce by reflex irritation of the nerves of the stomach and intestines increased peristaltic motion of the stomach and intestines. At the same time in empty stomachs these salts effect the dissolving of the mucus and promote the secretion of the gastric and intestinal juices. In this manner the contents of the stomach and of the intestine are reduced to a more fluid state and the increased peristaltic action effects a rapid and complete evacuation, even in cases of diminished reflex irritability or atony of these organs.

This removes the cause of the venous congestions and catarrhal inflammations of the stomach and alimentary canal, as well as the abnormal fermentation in the contents of the small intestine; the conditions necessary to a regular digestion are restored, assimilation is improved, and lastly, though slowly and gradually, nutrition is increased.

According to Heidenhain the increased

peristaltic action raises the propulsive force which drives the blood into the portal vein, and thus the venous hyperæmia of the bowels, the impeded circulation of the blood from the dilated intestinal capillaries and veins into the portal vein, and the plethoric stasis in the abdominal organs are relieved. By the simultaneous action of the thus regulated circulation of the blood in the abdomen and of the regular evacuation of the bowels, the maladies accompanying chronic catarrh of the bowels, such as hemorrhoids, hypochondriasis, etc., are greatly alleviated.

2. The diuretic effect of these waters is very decided. The large amount of carbonic acid contained in them effects a rapid and complete absorption of the mineral water, thus temporarily raising the flowing of the blood considerably, and increasing in a corresponding degree the secretion of urine by the kidneys for some hours after.

3. The passage into the blood of the alkalies of the mineral water, partially converted in the stomach into lactates and chlorides, increases the amount of salt contained in the blood, and thus also the general diffusion of the same in the tissues.

The blood containing more salt absorbs in its passage through the parenchymas more fluid matter, and thus brings about an increased excretion of water and destruction of albumen, so that a considerable rinsing and lixiviation takes place. The alkalies of the blood are excreted again with the urine and neutralise the phosphate of sodium, producing neutral or alkaline reaction. This alkaline reaction diminishes the irritation of the mucous membranes of the urinary organs, dissolves the mucus, and thus exercises a beneficial influence on the catarrh of the renal cavity, of the urinary bladder and the urinary ducts.

The sulphate of sodium, and above all the bicarbonates of lime and magnesia, fix, by their conversion into lactic or oxymuriatic combinations, the free and surplus acids of the stomach, and are therefore of first-rate importance as antacids.

This short sketch of the principal effects of the Tarasp Waters is perfectly in accord with experience. After taking from three to four glasses of the mineral water, drunk early in the morning at intervals of fifteen minutes, the first sensation experienced is a

feeling of warmth and tension in the stomach, which feeling soon disappears, however, after the eructation and escape of the carbonic acid. Gradually the effects of the water are perceptible in a slight contraction and griping in the bowels; the peristaltic motion drives the contents of the alimentary canal forward with loud audible rumbling noises, and in the course of a few hours after drinking the water, as a rule, one or two pappy stool-discharges take place, with which the effect of the water in this direction is generally at an end for the remainder of the day. Frequently, however, especially in the beginning of the treatment, as at Carlsbad, constipation occurs when only moderate doses are at first taken. Several causes no doubt contribute to this effect, especially the influence of the journey and of continued sitting still in the railway train or the diligence; then again the large quantity of carbonic acid contained in the water, which in small quantities occasions tolerably complete absorption; the influence of the chloride of sodium, which, by carrying a more readily assimilated chyme into the

alimentary canal, leaves but little matter for excrement; and lastly, the greater amount of salt contained in the blood, caused by the more complete absorption, and which withdraws more water from the matter in the alimentary canal and also excites to greater activity the intestinal epithelium. Upon drinking larger draughts of the water, from four to six glasses, several watery discharges occur in the course of the forenoon. If the doses are increased and frequently repeated the stomach's power of absorption is completely suspended. The salts enter the alimentary canal in an almost unchanged state, and besides this, transudation from the blood follows, so that severe and exhaustive diarrhœa sets in; digestion is completely destroyed, and acute catarrh of the stomach and intestines supervenes.

The above-mentioned effect of small doses of the water, in furthering absorption and the exsiccation of the contents of the alimentary canal, is of great importance from a therapeutical point of view in the treatment of chronic diarrhœa. In moderate, mildly aperient doses, the use of the Tarasp

water may be continued for a length of time with excellent results, without in the least disturbing digestion or too greatly weakening the system. This circumstance has been explained by a celebrated medical authority, Professor Frerichs, of Berlin, and the explanation given by him applies perfectly to the salt springs of Tarasp: "Very different, however, is the operation of these saline waters when common salt is present in considerable quantity. Here the favourable influence of the chloride of sodium upon the functions of digestion and assimilation, as well as upon chymification in general, makes itself manifest. The effect is milder, and if employed for any length of time, less exhausting and therefore more permanent."* This circumstance is of the greatest importance in relation to the frequent excellent results of treatment of general corpulency in Tarasp.

Hitherto it has frequently been maintained that the carbonate of sodium increases the combustion of fat, but this theory completely lacks proof, and the result

* Deutsche Zeitschrift für praktische Medizin. 1877. Nr. 35.

is plainly dependent upon the laxative effect of the waters; therefore the treatment can only be regarded as a mild course of reducing treatment. The diarrhoea caused by the saline laxatives in large doses diminishes on the one hand the absorption of the nutritive substances in their passage through the alimentary canal, and on the other hand, according to Zülzer, the gastric juice secreted in the upper part of the alimentary canal, by the pancreas and by the intestinal glands, is not, as under normal conditions, more or less reabsorbed, but is quickly passed through the intestines and excreted; for which reason also the albuminoids and chloride of sodium contained in certain quantities in the pancreatic secretions, and the iron and sulphur contained in the gall, do not return again to the body, but are rapidly excreted, thus bringing about a corresponding impoverishment of the system as regards these constituents.

The diuretic effect of the Glauber's salt springs appears either in the increased discharge of urine in the first two or three hours after using the water, or only in the course

of the afternoon, according to the quantity taken. If larger doses are taken, so that both salts and water reach the alimentary canal unabsorbed, of course no increase of diuresis is perceptible. If the waters are taken in small but often repeated draughts, an increase in the secretion of urine soon follows, as a general rule, and if a thorough rinsing and cleansing of the entire urinary apparatus is desired, it is advisable to dilute the mineral water with warm water and correspondingly increase the quantity drunk; this treatment, for instance, is adapted to certain cases of gravel and gout.

After having now thoroughly discussed the physiological and therapeutical effects of the Glauber's salt springs of Tarasp, we do not consider it necessary to detail in this place the various diseases in which the waters may be advantageously used, but will treat of the same in a later chapter together with the maladies in the treatment of which the remaining springs are of service.

C. The acidulous-chalybeate Springs or Iron Waters.

From fifteen to eighteen of the springs of our district belong to this group, and the neighbouring Sinestra-Thal alone possesses twelve of them. We shall, however, here discuss only the four situated within Tarasp-Schuls, and the medicinal properties of which are turned to account, together with the most important of the Val Sinestra springs, the Conradins-Quelle.

The Bonifacius-Quelle rises two miles to the south-west of the Kurhaus, on the right bank of the Inn. A small bridge conducts us from the high road opposite as far as the new Spa Pavilion, erected in 1877, and a narrow foot-path leads from this spring through the ravine of Val Zuort to Tarasp-Fontana. The Spring is protected from the river, which flows close by it, by a solid new embankment. The water of the spring is clear and colourless in the glass, which is immediately covered with bubbles of carbonic acid.

According to Husemann the temperature of the water was 47°.8 Fahr., the temperature of the atmosphere being at the same time 65°.4.

The mean specific gravity was computed at 1.0046. Husemann analysed in the same manner water taken from the Bonifazius-Quelle in very damp weather in the end of July, and again towards the end of August after a long drought. The result showed that the spring is variable both as regards the absolute and the relative proportions of its constituents. He therefore thought himself justified in concluding that "as a rule the spring is richer during the damp season in earthy constituents, that is, in the substances present in abundance in the rocks through which the waters flow, while in the dry season these decrease in quantity, but are replaced by an increase in alkalies, chlorine, sulphuric acid, and, in short, in the substances present in the rocks in smaller quantity and requiring a longer time for their separation". As best answering our purpose we give the following analysis made in the month of August, and add the analysis by Planta of the springs of Wyh and Sotsass, omitting the unimportant constituents present in minute quantities.

Table C. Analytical Table of the Iron Springs.

In 16 Ounces = 7680 Grains, Carbonates as Monocarbonates				Boni- facius	Wyh	Sotsass
Sulphate of potash	.	.	.	.589	.084	.038
" soda	.	.	.	1.840	.087	.153
Chloride of sodium	.	.	.	.300	.016	.077
Carbonate of soda	.	.	.	6.184	.028	—
" lime	.	.	.	15.286	9.467	7.970
" magnesia	.	.	.	2.589	.648	.600
" protoxide of iron	.	.	.	.141	.204	.098
Total of solid matters	.	.	.	27.866	10.696	9.173
Free and half-free carbonic acid	.	.	.	57.26	48.42	47.93
Quite free	"	"	"	32.82	38.37	39.49
Temperature in degrees Fahrenheit				47°. ¹ 8	47°. ² 7	48°. ³ 7
Analysis made by				¹	²	³
¹ Husemann,	² Planta,	³ Planta.				
1872	1859	1858				

From this analysis it appears that the Bonifacius-Quelle is far richer in solid constituents than the remaining iron springs of Tarasp-Schuls. Especially noticeable is the large proportion of carbonate of lime, the constipating effects of which are partly counteracted by the comparative abundance of aperient salts, — carbonate of soda and magnesia and Glauber's salt, while its antacid properties remain. The relative amount of carbonate of lime is much more considerable in the two other springs. The amount of iron and manganese contained in this spring is very small compared with that contained in the Wyh-Quelle and other iron springs, and taking into consideration the great abundance of other solid constituents, its effect cannot amount to anything, so that the Bonifacius-Quelle might more properly be regarded as a weak alkalosaline or Glauber's salt spring, or be placed in the class of earthy mineral waters. It bears a decided resemblance to some of the latter, especially to the Helenenquelle in Wildungen. This spring being very distant from the Kurhaus, but few patients drink the waters on the spot, and bottles

are therefore freshly filled each day and conveyed to the Rotunda of the Spa Building.

The Wyhquelle, known also as the Campellsquelle, rises at a distance of about one hundred yards above the most westward houses of Oberschuls. Opposite the Hotel Belvedere a steep foot-path leads to the elegant little wooden pavilion, visible from a considerable distance, standing on a projecting hill in the midst of the pasture lands between Schuls and Fettan. The Rotunda is merely roofed in, and affords a magnificent view in every direction; from the Rotunda a few steps lead down to a jet-pipe of the spring. A few yards above stands the basin of the spring, newly constructed in 1877 and fitted with a cover, upon raising which the waters are seen seething and bubbling beneath. The brightly coloured incrustation of ochre surrounding the spring makes it at once evident that it is an iron spring. The abundant supply of water, which is said to amount, since the new enclosure, to seven gallons per minute, or four hundred and twenty gallons per hour, flows off, mostly through underground pipes, into the new Bathing Hall

at Schuls. The water appears colourless and pellucid in the glass, and its taste is pleasantly cool and acidulous. The specific gravity is 1.0020.

The quality of the greatest importance for the baths is the very large amount of carbonic acid contained in this iron spring, which even surpasses that contained in the "Kalten Sprudel" in Franzensbad and in the steel spring in Schwalbach.

The Sotsassquelle, also known as the Well of St. Florin, issues from a wall of rock a few yards above the road leading to Sins or Sent, and branching off beyond Schuls to the left of the high road. At this spring also a drinking pavilion was erected in 1877 and the fountain carefully enclosed in a marble basin. The spring is much easier of access than the Wyh-quelle, there being no hill to ascend, but the view afforded here is by no means so fine and extensive. Since the new enclosure the supply of water has largely increased and is now about four and a half gallons per minute. The specific gravity, according to Planta's measurement, is 1.0019. From the foregoing analysis we see that this

mineral water contains a very large quantity of carbonic acid, but that its other constituents are present in such small quantities that they cannot possibly have any physiological or therapeutical effect. The total amount of solid constituents in one pound or 7680 grains of water is no more than 9 grains, of which nearly 8 grains are bicarbonate of lime. The iron does not even amount to one-tenth of a grain in the pound. Instead, therefore, of looking upon this spring as an iron water, as is usually done, we may with more correctness call it a simple acid spring, that is, a mineral water which is entirely wanting in effective quantities of salts and which is chiefly remarkable for the very large proportion of carbonic acid it contains, which renders it exceedingly pleasant and refreshing to the taste and well suited for use as a table water. For some years it has been used for the latter purpose not only in Tarasp-Schuls itself but in most of the hotels of the Upper Engadine and in Ragatz; it seems to be generally liked, and is exported in continually increasing quantities.

If we compare the Sotsassquelle in this respect with the favourite table waters of Giesshübl near Carlsbad and St. Galmier in France (Department Loire), we obtain the following result:

In 16 ounces = 7680 grains	Sotsass- quelle	Giess- hübl	St.Galmier
Bicarbonate of soda	—	9.16	4.30
Bicarb. of lime and magnesia	12.39	4.28	11.06
Free carbonic acid in cubic inches	47.0	49.2	40.0
Total amount of solid constituents	9.17	14.6	22.2

It thus appears that the Sotsassquelle is extremely rich in carbonic acid, but lacking in solid constituents; it is therefore exceedingly well adapted for a dietetic drinking water.

The Carolaquelle rises in the basement of the Carola-Building, already described, which stands on the right bank of the Inn, opposite the Kurhaus and close to the bridge. The supply of water it furnishes is very considerable, being no less than seven gallons per minute. The water is clear and sparkling, but leaves an inky taste in

the mouth and seems at times to contain a small quantity of sulphuretted hydrogen, so that it is less suitable for drinking and is now used exclusively for bathing purposes. The shaft of this spring, 24 feet in depth, is of Tarasp tuff. A sunken iron pump ends a few feet above the bottom of the well, and the pump, driven by the engine in the building opposite, forces the water through pipes passing along the bridge into the baths of the Kurhaus.

The Carolaquelle contains 8 grains of solid constituents to the pound of water, carbonates being reckoned as bicarbonates, and at a water temperature of $45^{\circ}.5$ Fahr. It contains 33.45 cubic inches of free and semi-free and 28.54 cubic inches of entirely free carbonic acid.

Of the great number of steel springs to be found near the village of Sins in the Val Sinestra we think it necessary only to mention the principal one, the Conradins-quelle. Unfortunately the entire group is very remote and difficult of access and the water is therefore not yet used on the spot. From the village of Sins, which we frequently had occasion to mention in the first

part of this work, the spring is reached on foot in one hour and a half; up to the present no carriage road has been constructed; it takes therefore nearly three hours to reach the spring from the Kurhaus at Tarasp. The Conradinsquelle is the only one of this group which is properly enclosed, and its waters are used in annually increasing quantities for export purposes.

On account of the amount of arsenic contained in it, which is greater than in the majority of mineral waters, and which is found in the water itself and not only in the ochreous sediment, this spring has been called an arsenious steel spring. Professor Husemann analysed it in 1875,* and according to him the Conradinsquelle contains in 16 ounces or 7680 grains of water the following more important constituent :

Sodium chloride	4.6237
„ borate	.8402
„ arseniate	.0153
„ sulphate	1.5814

* "Die arsenhaltigen Eisensäuerlinge von Val Sinestra bei Sent". Chur, 1876.

Sodium carbonate	1.7402
Calcium "	8.0305
Magnesium carbonate	1.7832
Iron "	.1782

The total of the solid constituents is 19.5936 grains. At a water temperature of 48°.4 Fahr. the spring contains 45.43 cubic inches of free and semi-free carbonic acid and 33.90 cubic inches of entirely free carbonic acid. The water is carefully bottled by means of a capillary tube of India rubber and may be obtained in a fresh condition in Tarasp-Schuls. We cannot attach any great importance to the arsenic contained in this spring, since no more than $\frac{3}{100}$ of a grain of arseniate of soda is contained in 36 ounces of the water, and we cannot conceive how this infinitesimal quantity, much more insignificant than the smallest pharmaceutical doses, can have any effect in the presence of the much larger quantities of other salts. Nevertheless we consider this a very important compound steel spring, in which the bicarbonate of lime forms the chief constituent and the iron is present in relatively large quantities, while besides this, all the im-

portant salt of the Luciusquelle are present, though only in much smaller relative proportions. In these respects the Conradinsquelle of the Val Sinestra forms a very valuable addition to the mineral springs of Tarasp-Schuls.

Concerning the physiological and therapeutical effects both of the water itself and of the carbonic acid, carbonate of soda, common salt, Glauber's salt, carbonate of lime and carbonate of magnesia, in order to avoid repetition we refer the reader to what has been said regarding the Glauber's salt springs. There remains for us only to discuss briefly the effect of the iron, which in the Wyhquelle is large in amount both absolutely and relatively, that is, in comparison to the small amount of solid constituents. The recent careful investigations of F. W. Hamburger and Quincke and the clinical experience of Frerichs have proved that each time but a very minute quantity of the iron taken into the stomach is converted into an absorbable salt, and that as a rule the greater part passes off through the bowels unchanged or converted into sulphuret of iron. Large doses of iron impede absorption

and the secretion of the acid of the stomach. The small portion of sulphate of iron absorbed enters the blood in chemical combination with albumen as iron-albuminate. We thus reach the theoretical conclusion that only small doses of iron accomplish the desired object and that it is an advantage of the steel springs that even large quantities of the mineral water only introduce a small amount of iron into the stomach, causing, however, so much the more to pass from the unaffected stomach into the blood. In such waters as contain a large quantity of other salts, our Glauber's salt springs and the Bonifaciusquelle, for example, the very minute quantity of iron has no perceptible effect. The investigations of Woronichin show that common salt promotes the absorption and assimilation of the iron, and in this connection we call special attention to the relatively large amount of common salt contained in the Conradinsquelle.

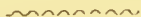
The mere introduction of iron into the stomach is not sufficient; the deranged assimilating functions must be restored in order to render possible the absorption of

iron by the blood. According to the computations of Boussingault more iron is daily taken into the stomach in the food than by drinking large quantities of mineral water comparatively rich in iron. This offers an easy explanation of the fact that the waters of the Bonifaciusquelle, and even of the Luciusquelle, taken in small doses, when their salts facilitate digestion, exercise a beneficial influence in cases of poverty of blood.

It is impossible to exaggerate the advantages flowing from the presence both of Glauber's salt springs and the various steel springs in Tarasp-Schuls, especially when it is considered that their effect is enhanced by the Alpine climate. The combined use of the two varieties of mineral waters, either simultaneously, or alternately, or in succession, is to be recommended in many groups of diseases and especially in numerous individual cases. By way of example we may mention cases of anæmia accompanied by obstinate constipation, and cases of chronic gastro-intestinal catarrh, which is nearly allied to anæmia. In promoting nutrition and a better formation of

the blood the favourable effect of the iron is seconded in a very efficient and enduring manner by the Alpine climate, and in this respect, too, Tarasp-Schuls affords very important advantages, inasmuch as it is situated at a greater elevation than any other health resort possessing iron springs, with the exception of St. Moritz.

We do not think it necessary to particularize here the diseases in which the various steel springs of Tarasp-Schuls may be advantageously used, but we shall do so later when discussing the symptoms which render a visit to Tarasp desirable.



VI. The Baths, their arrangement and their effect.



There are two bathing establishments in Tarasp-Schuls, one in the eastern wing of the Kurhaus Tarasp, as mentioned at page 23, and the other being the new Bathing Hall in Schuls, erected in 1879.

The bathing cabinets of the Kurhaus occupy two stories. In the basement are thirty second class baths and a shower bath, while in the upper story we find twenty-six elegant and comfortably appointed first class baths and also a separate shower bath. The steam necessary for heating the baths is obtained from the neighbouring engine house. The engine pumps the water of the Ursusquelle and of the new springs, used for salt water baths, and the water of the Carolaquelle used for steel baths, into separate reservoirs, from which it flows into the bathing-tubs.

The new Bathing Hall in Schuls, a plain but tasteful building of one story, stands on an open terrace of grass land between Ober and Unter Schuls, facing the south. Passing through the entrance we reach a large hall occupying the middle of the building, and on either side of which is a long wing containing nine spacious and lofty bathing cabinets, a shower bath, and a room for attendants. Above the hall are two large reservoirs, holding the acidulous-chalybeate water and the fresh water until required for use in the bathing cabinets;

at the same time these reservoirs supply the vase-like fountain in the centre of the hall, where the waters of the Wyhquelle may be drunk without the fatigue of ascending to the source of the spring.

Behind the Bathing Hall stands a smaller building containing the boiler. The steam here generated is conducted by means of pipes into the bathing cabinets.

At times only the water of the Wyhquelle is used for supplying the Baths in Schuls, it being brought through pipes more than a mile in length, and having a steep fall, from the reservoir above mentioned to the Bathing Hall.

The technical arrangement of the baths in the Kurhaus and in the Bathing Hall at Schuls is the same. Each bathing-tub is furnished with pipes supplying cold water, the mineral water, and the steam necessary for heating the baths; the bathing-tubs at the Kurhaus also have pipes for the conveyance of the salt water.

The heating is accomplished under a new and improved system, which is similar in principle to the so-called "Schwalbacher tub". In the latter tubs, which are con-

structed entirely of metal, the steam enters through a double bottom, entirely closed, and thus warms the mineral water, but this plan has one disadvantage, namely that the great heat of the bottom of the tub is often extremely uncomfortable for the bather. Under the system now employed at Tarasp-Schuls the heating of the mineral water is accomplished by means of six closed pipes arranged in serpentine coils and which may be easily screwed round the pipe conveying the steam, or removed from it, as occasion may require. By this contrivance of movable spiral pipes the water of the bath is heated in from five to six minutes to the temperature ordered by the physician, and one important advantage of this system is that the mineral water loses less of its carbonic acid than when Schwalbacher bathing-tubs are used.

Most of the tubs are of wood, which, being a bad conductor of heat, is less disagreeable to the patient, while it is at the same time more readily and thoroughly cleaned than metal.

In many of the cabinets an apparatus for shower baths is fixed above the bathing-tub.

The arrangement of the baths is also new; they are fitted with an apparatus furnished with a thermometer and allowing the temperature and pressure to be regulated at will. Besides the ordinary shower-baths, the jets of water may be either ascending, descending or lateral.

In spite of the constant and universal use of baths, very divergent views are at present held with regard to their physiological and therapeutical effects, but these various opinions it is needless to discuss here. We think it sufficient to mention the principal effects which have either been definitely ascertained or may be regarded as highly probable, following for the most part the views of Leichtenstern.*

Among the different healing agents the effects of which may partly be classed together, the chief place must be assigned to the temperature of the baths and its thermal effect. In the second place regard must be had to the mechanical influence of the mass of water and to the effect of the salts which it holds in solution and of the gases it contains.

* Loc. cit., p. 225.

It is perhaps most convenient to divide the baths according to their temperature into baths of average or mean temperature, and further into cold and warm baths. The temperature at which the bath is nearest the point of thermic indifference lies between 93° and 95° Fahr. Such lukewarm baths, it is true, exercise no perceptible influence upon the temperature of the body, the loss of heat, or the production of heat, any more than upon the respiration and circulation, but they lessen the excitement of the peripheral terminations of the sensitive nerves of the skin and thus also the excitement of the various nerve-centres. In cold and tepid baths the cutaneous muscular fibres contract rapidly and produce the so-called goose-skin.

The skin becomes cooled and thus the difference in temperature between it and the surrounding colder medium is diminished, and in consequence of this the loss of warmth becomes more gradual. At the same time, too, the smaller blood-vessels of the skin contract, naturally lessening the flow of blood to the skin. Although in this manner the loss of warmth is in some

degree obviated. still the total loss of heat in a cold bath is very considerable when the difference of temperature is great. Nevertheless the absolute or natural heat of the body does not sink during a cold bath, confirming the assertion of Liebermeister, that the heat formed is precisely equivalent in amount to the heat lost, so that the production of warmth rises in proportion to the loss of warmth. This latter process, which is the result of increased oxidation in the blood and tissues, is doubtless stimulated by means of the nervous system, the centripetal nerves extending the excitement to the brain and there setting in action the excito-caloric or moderating centres, which, transmitting by reflex their excitement to the channel of the centrifugal nerves, influence the process of oxidation. Simultaneously with the augmented formation of carbonic acid the excretion of carbonic acid is increased.

Besides this, during a cold bath the influence of the cold in certain peripheral nerves produces a heightened combustion of non-nitrogenous substances, so that the splitting up of fatty matters is thus promoted by the reflex action of the cold.

By the contraction of numerous arteries of the skin the tension of the blood is increased and the pulsations of the heart are rendered more frequent; this symptom, however, soon disappears, and a retardation of the pulse takes place. The respiration at first grows slower and deeper. The irritation of the sensitive cutaneous nerves by the cold also excites by reflex action the peristaltic motion of the intestinal tractus, activity of the bladder, movements of the uterus, of the cystic and urinary ducts, etc.

Cold baths and shower baths of short duration are stimulating and refreshing in their effect.

During a warm bath of the same temperature as the ordinary temperature of the skin, the normal loss of heat is diminished; if the temperature of the bath be higher, then heat passes into the body. The heat thus accumulates in the body, the temperature of which is consequently increased together with the production and excretion of carbonic acid and the frequency of respiration and of the pulse. The capillary vessels of the skin are enlarged, and by

this peripheric hyperæmia a portion of the blood from within is drawn outwards. The relaxation of the systemic circulation outlasts the warm bath several hours. A hot bath is followed by increased elimination of urea and increased metamorphosis of the nitrogenous principles. Prolonged warm and hot baths are thus as a rule relaxing and fatiguing in their effect. Warm baths may diminish or stop by reflex action convulsive contractions of voluntary or involuntary muscles, as in acute colic of the alimentary canal, in the passage of gall-stones, and in colic of the kidney, bladder, or uterus.

Both cold and warm baths probably produce various other, at present unknown, effects upon the functions of the organs, as for instance upon the secretions of the stomach, pancreas and liver, upon the absorption in the alimentary canal, upon the movements of the lymph, upon the trophic nerve centres and through these upon the minute processes of tissue change.

After bathing a loss of warmth in proportion to the outward conditions always takes place, the effect as well of the rapid

evaporation of the water absorbed by the superficial layers of epidermic scales as of the dilatation of the cells of the skin, which is an after-effect both of warm and cold baths. For a short time after a bath, whether hot or cold, the amount of urine is frequently increased and its specific gravity lowered, but the total secretion of urine during the twenty-four hours is not materially affected.

The mechanical effect of the bath, produced by the weight, the contact and the adhesion of the water, may be summed up together with the similar effects of the temperature and the gas and salt contained in the water, as stimulation of the skin.

Both the salt contained in our alkaline baths and the iron contained in our steel baths are so far devoid of any importance in regard to the physiological effect of the baths, as according to the present state of science the theory of their absorption from the water by the blood is quite untenable. Under favourable conditions small quantities of the free carbonic acid of the water may be absorbed, but this must be regarded as a purely physical process of diffusion,

rendered much slower by the intervening epidermis, and being also dependent upon the tension of the carbonic acid of the blood. However both the mineral constituents and the free carbonic acid of the baths stimulate the nerves of the skin. The quality of the effect is the same with each, but its intensity is much greater with the carbonic acid, since in a steel bath very rich in carbonic acid, and therefore sparkling and hissing like champagne, the skin is immediately covered with millions of small gas bubbles and is soon intensely reddened. It is possible, although strict proof has not yet been given, that the baths affect the minute processes of change of substance either directly, or indirectly by means of the secretions, the circulation, the lymphatics, etc.

The various kinds of baths in use at Tarasp-Schuls may be classed under two heads: baths with still water, as the sitting bath, the half bath, and the full bath; and baths with agitated water, the friction baths and shower and douche baths, which are more powerful in their effect, owing to the constant repetition of the stimulant of cold.

From the foregoing it will be seen that the fundamental character of the effect of cold and hot baths leads nearly to the same result. While the cold induces by greater stimulation an excitation of most of the vital functions, the heat brings about theoretically the same result by another mechanical process, favouring and rendering physically easier the exercise of the vital functions. The selection of a case for the employment of cold baths assumes therefore a certain integrity of the vital functions, while the counter-indications may thus be readily known. For those requiring more careful treatment, that is, for the great majority of invalids, either the tepid or moderately warm baths should be ordered, according to the particular requirements of the individual case.

If the above-mentioned varieties of baths are adapted as much as possible to the individual, and with due regard to the patient's strength and general state of health, they will be found to be valuable aids to the climate and the drinking of the mineral waters.

VII. The mode of employment of the Mineral Waters of Tarasp-Schuls and the Tarasp-Lozenges.



The Tarasp waters can of course be used at home as well as at the Springs. The latter method, however, possesses very decided and important advantages, arising from the highly favourable influence of the Alpine climate, the journey, the change of diet, and the increased bodily exercise; we therefore proceed to consider it first.

For persons requiring very indulgent treatment a preparatory course of treatment is necessary by way of introduction to the changed manner of life. In such cases a rapid and abrupt change of climate should be avoided, and a preparatory short stay in some less elevated climatic health resort is therefore strongly to be recommended.

It is scarcely necessary to remark that the summer is the best time in which to enter upon a course of treatment at the Baths themselves, since at this season of

the year it is possible to avail one's self almost uninterruptedly of the benefits of the fresh air, while, if the weather be favourable, both the journey and the residence in the Kurhaus are rendered more enjoyable. Although the season in Tarasp-Schuls lasts from the middle of June to the middle of September, visitors do not begin to arrive in considerable numbers until the first days of July, while in the first week of September the Baths begin to re-assume a desolate and deserted appearance.

Again calling attention to the tables of temperature, pp. 43 and 44, we expressly repeat that Tarasp-Schuls, in spite of the great altitude at which it is situated, affords, by reason of the peculiar and favourable character of its climate, very satisfactory conditions at the beginning of June as well as at the end of September and beginning of October; and moreover these months are much to be preferred to July and August in the case of persons requiring a cooler air and more bracing treatment.

It is impossible to lay down a universal rule as to the duration of a course of

treatment; this must depend entirely upon the very diverse individual circumstances, upon numerous occurrences during the treatment which cannot be foreseen, upon the state of the weather, and, lastly, upon the nature of the disease itself. The system will be found to gradually accomodate itself to the climate, and it is therefore in many cases advisable to follow up a visit to Tarasp of three or four weeks by a shorter or equally long stay in the Upper Engadine, by which means the stimulating properties of the mountain climate are again brought into play. In other cases merely moderate doses of the mineral water continued for a correspondingly lengthened period produce the desired result.

The early morning is generally deemed the best time for drinking the waters, but there is no doubt that the tyrannical enforcement of this rule in many health resorts is productive of much harm. The principle on which the rule is based, namely that the empty stomach absorbs the water quicker, is correct, but the rule itself has nevertheless numerous exceptions. The waters,

either cold or warm, disagree with many people unless they have previously taken a cup of hot tea or hot milk, which is moreover very rapidly absorbed. Others again, before drinking a large dose of warm mineral water, take a small quantity of cold water, with the object of exciting the activity of the stomach. Many cannot take the mineral water before having had a light breakfast. Invalids who have lived for a long time in southern or tropical countries digest the mineral waters only in bed or during the warm part of the day, and to many, especially to very nervous persons, the early rising is decidedly injurious.

It is of course impossible here to lay down rules adapted to every individual case, considering the combinations of circumstances which arise and which cannot be foreseen, demanding more or less variation from the usual mode of procedure; in this respect the detailed instructions and uninterrupted care of the Spa physician are absolutely necessary. Neither can we lay down any general rule with regard to the temperature of the water and the quan-

tity to be taken, nor respecting the advisability of the customary promenade at the springs, which frequently causes fatigue during the remainder of the day and is therefore better omitted.

The same may be said regarding the time for the bath. Only very robust persons are able to take the bath before having breakfasted and after having drunk the waters. For the most part it is better to take it a few hours after breakfast and before the midday meal. A rest in bed after the bath is only necessary in the case of individuals requiring great indulgence; it is as a rule better to take exercise in the fresh air immediately after the bath. The duration of the bath must vary in each individual case according to the temperature and the kind of bath. Cold baths should be of short duration; the steel baths should always be taken somewhat cooler than the salt baths and should never last more than half an hour. In most cases, days of rest must frequently be allowed, and if possible the rainy days should be utilized for this purpose.

Is respect to clothing we must remark that having regard to the rapid changes in temperature which frequently occur at the great altitude at which Tarasp-Schuls is situated, a sufficiency of warm clothing for the cool mornings and evenings is indispensable. The increased solar radiation brings about very considerable differences in temperature between the sunny and shady spots passed in the course of a walk. Also upon ascending to the more open plateau from the sides of the lower and narrower part of the valley a fresh breeze is constantly encountered. It is therefore advisable for those undertaking walks, etc., to be provided with overcoats, shawls and wrappers.

Concerning the directions for the home use of the Tarasp waters, we shall here confine ourselves to advice respecting the Glauber's salt water, the water of the steel springs not being exported in large quantities at the present time. The water of the Luciusquelle may be obtained of the principal mineral water dealers in all the large towns throughout Europe; in London of R. Davis, 20, Maddox Street, Regent

Street. The Luciusquelle being so extremely rich in free and latent carbonic acid, far surpassing all other springs in this respect, its waters are especially adapted for export purposes, being but little affected by transportation to distant countries or even by being stored up for a length of time.

In order to preserve the carbonic acid as far as possible after opening the bottle at home, it is advisable to recork the bottle at once with a new cork and place it neck downwards in a basin of cold water until again required.

The diet proper to be adopted during a course of treatment at home, as well as the detailed instructions concerning the use of the waters, depends absolutely upon the individual malady, and therefore the family doctor, who may be supposed to be acquainted with the case in question, must be consulted with regard to this matter.

By evaporation of the waters of the Luciusquelle the salts are obtained from which, in a fixed proportion, the Tarasp lozenges are prepared, similar to the *Pastilles digestives* of Vichy and the pastilles of Ems and Kissingen. They are chiefly

of service in disorders of the digestive organs, in too great and abnormal acidity of the stomach, in pyrosis, flatulency, etc., and are also esteemed as remedies for hoarseness and chronic coughs. In most cases it is best to take from one to three pastilles from two to four times a day a short time before meals, and to wash down the lozenges with a little fresh or effervescing water (Seltzer, Soda, etc.)



VIII. Diet while under Treatment.



Dr. Pavy, in his valuable and really classical work*, which we shall in most instances follow in our instructions as to diet, writes as follows: "Holding the position that food does in relation to the operations of life, the art of dietetics not only bears on the maintenance of health, but is cap-

* F. W. Pavy, M. D., F. R. C. P. "A Treatise on Food and Dietetics Physiologically and Therapeutically Considered." Second edition. J. and A. Churchill. London, 1875.

able of being turned to advantageous account in the treatment of disease." In certain diseases a suitable diet is often the most important factor in effecting a cure by means of the mineral water treatment; for this reason no spa physician, however much he may be occupied, should grudge the time necessary for giving his patients the minutest possible instructions with regard to the dietary suited to the case in question, nor should he omit to insist positively upon his instructions being carried out.

Before going further we will devote a few words to the dietary usually adopted in Tarasp-Schuls, but to which we are unable to give our approval, and we shall afterwards detail the dietetic rules adapted to the diseases for the cure of which invalids most commonly resort to Tarasp-Schuls; it must of course be understood that special cases will constantly arise demanding various modifications of these rules.

In Tarasp-Schuls and throughout the Engadine, owing to the great number of visitors, a large part of the provisions required must necessarily be conveyed from

a great distance, involving considerable difficulty in their transportation over the mountain passes; this accounts for the fact that dining *à la carte*, the only rational method for such a health resort, has not been brought into vogue. For this reason the Kurhaus, and, following its example, most of the other hotels in the place, have accepted the method of a common *table d'hôte*, and the following dietary has been drawn up by Dr. Killias:

A. Articles allowable for Food and Drink: Beef, veal, tongue, air-dried meat, raw lean ham. Fowl, pigeon, turkey. Game (except black game). Trout, grayling, pike, sole. Soft-boiled eggs. Spinach, cauliflower, carrots, artichokes, potatoes (fried or mashed), green peas, quite young beans. Rice, sago, the best maccaroni; light corn-flour and similar preparations; puffs and other pastry; cooked fruit.

Red wine; white wine (if not sour). Coffee, tea, chocolate, cocoa, milk. Beer only if light and well fermented (Pilsener and ordinary draught beer); English Ale.

B. Articles to be avoided: Pork, roast goose and duck, fried liver, kidneys, heart,

etc.; eel, salmon; ripe beans; raw fruit, nuts, almonds; salad; rich and heavy pastry with almonds or spices; cheese. Butter in moderation may, in *exceptional* cases be taken, but in general it is better to avoid it. Strong and heavy wines, strong beer, and all strong spirituous liquors.

It must be thoroughly understood that it is not the mineral water, but the condition and the particular malady of the patient which renders a certain article of food harmless or injurious. This being the case, and there being two perfectly distinct groups of springs, which attract persons of very different constitutions and afflicted with very different diseases to Tarasp-Schuls, it is clear that a *table d'hôte* cannot possibly meet the dietetic requirements of all. Dishes selected from the above list are, nevertheless regarded as forming the perfection of a *menu* for invalids.

This list, however, includes various articles of food which we cannot but regard as injurious in certain groups of sicknesses, while on the other hand it is decidedly too restricted for convalescents, for persons requiring more strengthening food or suffer-

ing from anæmia, as well as for those accompanying the invalids. We therefore advise all those who are really desirous of being restored to health, and especially such as are suffering from the severer forms of dyspepsia, to obtain from their physician exact instructions with regard to the diet specially suited to their case, and to dine *à la carte* in strict accordance with the advice they have received from him. If the patients themselves are convinced of the absolute necessity of such a step, and are firm in their demands, experience teaches that hotel-keepers will show themselves ready to meet the wishes of their guests in this respect.

With regard to Breakfast, the first point requiring notice is the prohibition of fresh butter, a prohibition which seems to us somewhat difficult to defend, seeing that pastry, which is permitted, and which is generally consumed without stint after the long promenade at the Springs, contains a large quantity of butter. We believe it to be more advisable to let the breakfast consist of a moderate portion of cold roast meat, a steak or a mutton chop, together

with a soft-boiled egg and white or brown bread, instead of overloading the stomach with large quantities of amylaceous matters and the jams or honey usually served at the same time and also containing sugar in superabundance.

As a drink, either coffee, tea, chocolate or cocoa may be taken; but in cases of impaired digestion they must give place to milk, broth, or beef-tea.

Supposing breakfast to be taken at eight or nine o'clock, a second meal should be eaten at one o'clock at the latest. "A fairly substantial meal should be taken at this time, and it does not signify whether it goes under the name of luncheon or dinner." If dinner be taken in the middle of the day, a light supper should follow at not too late an hour in the evening. Persons accustomed during many years to take lunch in the middle of the day and not to dine until the evening would not do well, however, to suddenly adopt a contrary system, and such persons will find opportunity in the larger hotels of Tarasp-Schuls to continue their wonted habits.

In cases of derangement of the digestive organs a proper diet is of the utmost importance, for “here, dealing with the immediate reciprocity that is observed to exist, the character of the food forms an all-important matter in the management of the case; indeed, it is not too much to say, that there is usually more to be done by proper dieting than by the agency of drugs; and, without some attention to dietetics, drugs will rarely be found to prove efficacious in affording relief.” The limited space at our disposal forbids us, however, to enter more fully into details. In conclusion we merely subjoin the dietaries in the treatment of obesity and diabetes, from the above-mentioned work by Dr. Pavy.

1. Dietary for the treatment of obesity :

“As a *résumé* for the guidance of the corpulent, it may be said that the fat of meat; butter; cream; sugar and sweets; pastry; puddings; farinaceous articles, as rice, sago, tapioca, etc.; potatoes; carrots; parsnips; beet-root; sweet ales; porter; stout; port wine, and all sweet wines, should be avoided

or only very sparingly consumed. The articles allowable, and they may be taken to the extent of satisfying a natural appetite, are lean meat; poultry; game; eggs; milk moderately; green vegetables; turnips; succulent fruits; light wines, as claret, Burgundy, hock, etc.; dry sherry; bitter ale in moderation; and spirits. Wheaten bread should be consumed sparingly, and brown bread is to some extent better than white."

2. Dietary for the diabetic:

"May eat: Butcher's meat of all kinds, except liver. Ham, bacon or other smoked, salted, dried or cured meats. Poultry. Game. Shell-fish and fish of all kinds, fresh, salted, or cured. Animal soups not thickened, beef-tea, and broths. The almond, bran, or gluten substitute for ordinary bread. Eggs dressed in any way. Cheese. Cream cheese. Butter; cream. Greens; *spinach; *turnips; *French beans; *Brussels *sprouts; *cauliflower; *broccoli; *cabbage; *asparagus; *sea-kale; vegetable marrow.

* Those marked with an asterisk may only be eaten in moderate quantity, and should be boiled in a large quantity of water.

Mushrooms; water-cress; mustard and cress; cucumber; lettuce; endive; radishes; celery. Vinegar; oil; pickles. Jelly flavoured, but not sweetened. Savoury jelly. Blanc-mange made with cream, and not milk. Custard made without sugar. Nuts of any description, except chestnuts. Olives.

Must avoid eating: Sugar in any form. Wheaten bread and ordinary biscuits of all kinds. Rice; arrowroot; sago; tapioca; maccaroni; vermicelli; potatoes; carrots; parsnips; beet-root; peas; Spanish onions. Pastry and puddings of all kinds. Fruits of all kinds, fresh and preserved.

May drink: Tea; coffee; cocoa from nibs. Dry sherry; claret; dry Sauterne; Burgundy; Chablis; hock. Brandy and spirits that have not been sweetened. Soda water. Bitter ale in moderate quantity.

Must avoid drinking: Milk except sparingly. Sweet ales, mild and old. Porter and stout. Cider. All sweet wines. Sparkling wines. Port wine, unless sparingly. Liqueurs."

IX. Indications for treatment in Tarasp-Schuls.



Many different factors combine in producing the results of the bathing and mineral water drinking treatment at the different health resorts. Besides the climatic, pharmacodynamic and hydro-therapeutic effects, which we have discussed at length in the preceding chapters, we may enumerate, as not without influence, the journey, the changed mode of life, the increased bodily exercise, and above all the psychical influence of the magnificent scenery of the Alps. What part each of these factors plays in producing the favourable therapeutical results attained, it would be difficult to determine. Nothing but long experience and careful observation of individual cases can put us in a position to form a correct judgment with regard to the diseases which may be most appropriately treated in a given health resort, and all experience and observation goes to show that, as regards Tarasp-Schuls with its manifold healing agents, the following maladies may here be advantageously treated:

A. General anomalies of nutrition.

1. *Obesity in general.* In the plethoric form the Glauber's salt springs are used; in the anæmic form, the steel springs. The Alpine climate and the increased corporal exercise to which the magnificent mountain scenery invites, together with a proper diet, materially conduce to a favourable result.

2. *Gout and tendency to gout*, as increased formation of fat, and stases in the portal system; enlargement of the liver; obstinate catarrh of the stomach, with excessive acidity or largely developed hemorrhoidal conditions.

3. *Diabetes mellitus.* Dr. Braun, in his "Handbook to the Spas of Europe (abridged translation by Dr. Herm. Weber)" speaking of Tarasp in connection with this malady, says: "In these cases, the high position of the place and its equable and mild climate add their efficacy to the nature of the springs, and for this reason we consider it very desirable that the treatment of diabetes should be tried at Tarasp and the advantage of the springs tested."

“Tarasp resembles Carlsbad with respect to its amount of Glauber’s salt, but surpasses it threefold in its amount of chloride of sodium and carbonate of soda; and moreover it would be desirable to ascertain what advantage at the same time may be afforded by the mountain air, at an elevation of 4000 feet above the sea.”

Although our experience with regard to cures of diabetes at Tarasp is not very extensive, we have arrived at the conclusion that a large share of the favourable results must be attributed to the Alpine climate and the more regular and frequent bodily exercise, together with the observance of a fitting diet. For an after-course the iron springs of Tarasp or of the more elevated St. Moritz may be recommended.

4. Anæmia, whether brought on directly by sudden or violent bleedings, or by large and rapid exudations, or indirectly in consequence of long-continued loss of juices (suppuration of the bones; diarrhœa, *fluor albus*, etc.) or over-exertion, bodily or mental, — whatever the cause of the malady, the combined influence of the Alpine climate and the iron springs produces the best

results. In cases where torpidity of the intestinal canal predominates, or where the sluggishness of the bowels would only increase under the influence of the steel springs, small doses of the Glauber's salt waters soon produce the desired effect.

5. Chlorosis. Experience shows that a radical cure of this malady is only to be effected by the free use of large doses of pharmaceutical preparations of iron. Still the steel waters, in combination with the other healing agents, present very effective means of checking the advance of chlorosis where a tendency to the disease shows itself. Sufferers from this malady are frequently liable to obstinate constipation, which may be removed by the simultaneous use of the alkalo-saline springs.

6. Scrofula is generally influenced by the sea or Alpine air. In the case of debilitated individuals and of persons suffering from scrofulous glandular swellings, the combined influence of the Alpine climate in Tarasp and the Glauber's salt springs, rich in common salt, is attended with very beneficial results.

B. Diseases of the chylopoetic organs.

7. *Chronic catarrh of the stomach* with the most varied forms of dyspepsia, of excessive formation of acid, of atony and of flatulency, often accompanied by constipation, vomiting or diarrhœa. The diet should be carefully regulated, while at the same time the stomach must be frequently cleansed with diluted Glauber's salt water by the careful employment of a stomach-sound or stomach-pump.

8. *Chronic ulcers of the stomach* also yield to the use of the Glauber's salt springs, but care must be taken that, together with consistent dietetic treatment, only a small dose of the water be taken at one time, and that it be warmed up to 100° Fahr., in order as far as possible to effect the removal of the carbonic acid.

9. *Gastralgia*, as an independent malady, is rare; as a symptom of abdominal stases it is included in the indications for the Glauber's salt springs, and as a symptom of chlorosis and hysteria in the indications for the steel springs.

10. *Chronic catarrh of the bowels* is in most cases accompanied by atony of the intestinal canal, and therefore with habitual costiveness; or else constipation alternates with diarrhœa. In chronic diarrhœa an excellent result is obtained by taking small doses of the Lucius and Emerita springs, or by using the Bonifaciussquelle, which is rich in carbonate of lime.

11. *Plethora abdominalis; increased venosity; hemorrhoids; hypochondriasis and simple melancholy* all result for the most part from congestion and sluggish systemic circulation in the abdominal and pelvic organs, which may arise from the most diverse causes. By the stimulation of the peristaltic action by the Glauber's salt waters the regulation of these disturbances of circulation is effected in the manner already described. In Tarasp, with its Glauber's salt springs on the one hand, and its steel springs and elevated situation on the other hand, both the corpulent and the lean hemorrhoidal type may be advantageously treated.

12. *Chronic hyperæmia of the liver*, above all that chronic congestion of the liver

induced by rich and luxurious diet, by a sedentary mode of life, etc.; also enlargements of the liver in consequence of intermittent fever and malaria.

Even in symptomatic congested liver, arising from slight valvular affections, the combination of the Glauber's salt and the steel springs, if carefully administered, will produce excellent results. Fatty degeneration of the liver is merely a partial symptom of the general obesity mentioned in Section I.

13. *Catarrhal inflammation of the bile-passages* is in most cases only recognisable through its most important and frequently only symptom — jaundice. In Tarasp gallstones are frequently passed, sometimes unexpectedly, and in various similar cases excellent results are obtained.

14. Chronic spleen-tumours following intermittent fever and chronic malarious infection are often successfully treated in a short time, with the co-operation of the Alpine climate.



C. Diseases of the Urinary Organs.

15. *Chronic catarrh of the bladder and renal cavity.* The increased alkaline reaction of the urine, induced by the alkalo-saline water, renders the mucous matter more fluid, lessens the irritation of the sour urine, and in this manner has a favourable effect upon the diseased mucous membrane.

16. *Calculous concretions in the kidneys or bladder* are favourably affected by the diuretic properties of the Tarasp water, which effects a thorough cleansing of the urinary organs; the cure is accelerated by the use of warm baths. In cases of concrements of uric acid the Glauber's salt waters, and in cases of stones formed of phosphate of lime, or oxalates, the Sotsass iron waters, will be found beneficial.

17. In some instances of *chronic Bright's disease* small doses of the Luciusquelle have proved very efficacious; and in chronic loss of albumen by the urine, small doses of the Bonifaciusquelle.

18. *Swellings of the prostatic gland* cannot be entirely removed by the alkalo-saline waters, but these are valuable remedies for the concomitant catarrh of the bladder.

D. Sexual Diseases of Women.

19. *Chronic meritis and chronic catarrh of the uterine and vaginal mucous membrane, and anomalies of menstruation.*

The special indications must not be measured according to the local circumstances, but entirely according to the general state of health, and thus in plethora, obesity, disorders of digestion and habitual costiveness the Glauber's salt springs are to be employed, and in chlorosis or anæmia the iron waters.

E. Diseases of the Respiratory Organs.

20. *Chronic catarrh of the larynx and throat.*
The property of dissolving mucus possessed by the Glauber's salt waters renders them useful for drinking as well as for gargling and inhaling.

21. *Chronic bronchial catarrh*, especially in the case of persons of a full habit of body, or when complicated by dyspepsia, constipation or hemorrhoids.

22. *Asthma and pulmonary emphysema*, particularly when accompanied with immoderate formation of fat. The simultaneous

influence of the elevated Alpine climate is here of considerable importance.

23. *Pleuritic exudations.* The diuretic effect of the waters, and especially the influence of the rarefied atmosphere, permit the absorption of the remains of exudations.

F. Diseases of the Heart.

24. Slight valvular affections, in which compensation has taken place and the propulsive energy of the muscle of the heart has not sunk too low, may be successfully treated with the assistance of the climate and with proper care.

25. *Fatty degeneration of the heart*, of course only in its incipient stages, has frequently been very successfully treated in Tarasp, with suitable diet and general treatment, but we are inclined to ascribe the cure to the agency of the climate.

G. Diseases of the nerves.

26. *General nervousness* (neurasthenia, spinal irritation, etc.) hysteria, and some cases of neuralgia are favourably influenced

by the mountain climate of Tarasp, which has also frequently proved an excellent intermediate station for the Upper Engadine. If anemia predominates, the simultaneous use of the steel baths, rich in carbonic acid, is attended with satisfactory results.

27. *Paralyses* following great loss of blood, typhus, diphtheria, etc., are speedily relieved if gently and carefully managed.

We do not think it necessary to enumerate the counter-indications, which may be readily gathered from the physiological and therapeutical effects of the mineral waters already described, as well as from the general principles of rational therapeutics. We therefore here conclude our medical account of Tarasp-Schuls, trusting that the foregoing remarks will have sufficiently demonstrated that *so fortunate a combination of a thorough and effective Alpine climate with such important and copious Glauber's salt springs, with various iron waters and with a simple steel spring, can be found nowhere but in Tarasp-Schuls, which is thus shown to be a Health Resort deserving of more than common attention.*

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Schloss Tarasp



## X. Excursions and drives in the environs of Tarasp-Schuls.

Upon the visitor's crossing the threshold of the hotel to obtain the necessary exercise in the open air, the mountain world in all its majesty unfolds its charms before him. In the immediate neighbourhood there will be found an abundance of charming spots presenting ever changing scenes and lovely views, now of the pleasant and shady wooded hills close by, and now of the bold and dazzling peaks of dolomite which rear aloft their mighty crests on either hand; here stretches a verdant terrace affording a nestling place for some peaceful village, while yonder are the solitary and desolate ravines of the Scarlthal. Excellent roads facilitate the pleasantest excursions both on foot and in vehicles to the charmingly situated villages of the surrounding country, and we need scarcely add that the naturalist will have no difficulty in securing, in the course of his walks, a rich and varied collection of rare Alpine plants, insects and minerals. Although it does not lie within the scope of this little

work to give visitors a complete description of all the excursions which may be made from Tarasp-Schuls, still it may not be unacceptable to those seeking restored health, for whom we are especially writing, and who are necessarily somewhat restricted as regards excursions, if we indicate a few of the most remarkable and interesting spots in the vicinity.

#### A. Excursions.

1. From the Kurhaus Tarasp a new and good road leads through Vulpera to the hamlet of *Tarasp-Fontana*, a description of which will be found at pp. 39 and 40. The incomparable beauty of its situation and the magnificent prospect it affords, render it one of the favourite excursions of visitors to Tarasp-Schuls. The picturesque ruins of the *Castle*, perched upon the brow of a steep hill, and towering above the surrounding heights, are well worthy of a visit. From the high road a narrow road leads eastward to the first house of the hamlet of Sparsels, before reaching which, however, a foot-path bends to the

west, leading us past several ruined guard-houses and signal towers to the ancient gateway and spacious forecourt of the castle. A paved path, in many places overgrown with grass, brings us to the desolate and silent halls of the castle. The handsome wainscoting of some of the apartments bears witness to the former magnificence of the decorations. The ancient embrasures afford many a glimpse of the enchanting landscape without, which presents continually new aspects as we change our point of view. At the foot of the castle, near the high road and surrounded by meadows, lies the clear, sedge-bordered Lake of Tarasp, its waters teeming with fish, mostly pike and carp. A conveyance requires somewhat less than an hour to reach Tarasp, and thence it is not more than half an hour's drive to the Kurhaus.

2. On the ridge of a mountain-spur extending from behind Schuls to Remüs stands the stately village of *Sins*, Romansch *Sent*, (Hotel Helvetia). The village, which from a distance is only partly visible, is the most populous in the Engadine. An excellent road curves to the left immediately

beyond Schuls, passes close below the Sotsassquelle, and, leading in gentle ascents upwards for about three miles, brings us to Sins. The neat and comfortable appearance of the houses and their surroundings bears witness to the prosperity of the villagers, who emigrate in considerable numbers to acquire, if not wealth, still a moderate competence, as coffee-house keepers and confectioners in other lands.

The ruins of the ancient church of St. Peter, standing on a rock outside the village, afford a very fine point of view. The road runs beyond Sins and leads down to Grusch, whence we may return to Schuls by the high road in three quarters of an hour.

3. From Schuls a drive of an hour along the high road brings us to *Remüs* (Faller Inn). This village, built against the precipice, somewhat above the floor of the valley, and formerly quite a considerable place, was almost totally destroyed by fire on the 16th of July, 1880. From the bridge before the village, to the left, we may observe the ruins of the castle of Tschanuff, looking down upon the steep and barren rocks of the Wraunka or Sinestra Gorge.



Ardetz



A good path leads from Remüs to these ruins.

4. To the west of the Kurhaus, about one and a half hours' ride by diligence, is the hamlet of *Ardetz* (Post and Pinösch Inns). A picturesque road, at first running close by the River Inn, and then cut in the rock and gradually ascending in wide curves high above the deep wooded ravine of the Inn, leads to the village, which contains an unusual number of interesting old houses, with quaint devices painted above their doors. The houses extend around the barren hill on whose summit stand the gray and crumbling walls of the castle of Steinsberg, together with a well preserved tower which is deserving of inspection.

5. From *Ardetz* a new road, picturesque in the extreme and commanding extensive views, leads us in three quarters of an hour to *Fettan* (described at page 38). Before reaching the village a path winds across the fields to a plantation of larches, bearing the idyllic name of 'Paradise', to which the superb prospect it affords fully entitles it. To the north of this, on the same side of the village, stands the Mott

Pednal, a hill likewise commanding a splendid panorama, in which the opposite side of the valley, which here appears to stand out as a separate and wildly rugged rocky wall, is the most striking object. The hill, which is easily ascended, still bears traces of a castle which once occupied its summit. To the east winds a new and well kept road leading to the boundaries of the district of Schuls, and after the restoration of the Schuls road, which will shortly be completed, in going to or returning from Fettan we shall be able to avail ourselves of the much shorter route through Schuls.

6. A longer excursion, to properly enjoy which almost an entire day is needed, may be made to *Guarda*, (5414 feet; Sonne; Silvretta,) charmingly situated on a beautiful sunny terrace of meadow-land. If we dine in Guarda time enough will remain for an easy walk to the Val Tuoi, which is decidedly worth visiting. Upon arriving at the gorge-like entrance to the valley we see on the left beautiful verdant meadows and magnificent Alpine pastures, and to the right, barren and glacier-like precipices, while in the background rises the majes-

tic Piz Buin, and to the east towers the serrated summit of the Piz Cotschen.

7. Still further up the valley, in a sunny nook on the high road, stands the trim hamlet of *Lavin*, (4692 feet; Post; Steinbock) which was destroyed by fire in 1869, but has since been rebuilt. It forms a convenient starting-point for several interesting Alpine expeditions, especially for the ascent of the neighbouring Piz Linard (11,208 feet,) which presents such a beautiful appearance when viewed from the Kreuzberg, near Tarasp. A newly constructed footpath renders the ascent, which was formerly somewhat difficult, quite free from danger, and the view from the summit surpasses that from the Piz Lanquard, near Pontresina, both in extent and variety. The awful wildness and desolation of the ice-crowned summit, and the vast sea of peaks surrounding it, cannot fail to make a profound impression upon the beholder.

8. The favourite and certainly the most enjoyable excursion of visitors to Tarasp-Schuls is that to *Hochfinstermünz*, the picturesque frontier-fortress of the neighbouring Tyrol (3730 feet.) The journey there

and back occupies from eight to nine hours. The high road leads through Schuls and Remüs, through the Pass of the Platta Mala, and past the village of Strada, through a picturesque ravine, down to Martinsbruck. Arrived here, good pedestrians may considerably shorten the journey by striking into a (tolerably bad) foot-path on the left bank of the Inn; this path leads past the Novellerhof to the bridge which crosses the Inn at Finstermünz. The high road crosses the Inn and the Austro-Swiss boundary at Martinsbruck, and the magnificent new Austrian road leads first by gentle ascents to the Norbertshöhe and then down again to Nauders, destroyed by fire in 1880; here it turns off to the left in the direction of the Finstermünz Pass. Hochfinstermünz consists off a group of houses on the high road and a hotel. Far below lies the old Finstermünz (3206 feet) with its tower and bridge over the Inn. We are here afforded a superb view of the dark and narrow gorge through which the Inn issues from the Engadine, with the mountains of the Engadine in the background. The old road forms a striking contrast to the admirable

new scientific road with its countless arches thrown from rock to rock.

## B. Walks in the immediate neighbourhood.

1. To the *Kreuzberg*, a hill situated between Vulpera and Tarasp and easily recognisable by the cross which rises on its summit. The view obtained here is very extensive; the panorama by Steudel may be had at the Bazaar Stöckenius.

2. From Vulpera ascending eastwards, past a point of view named 'Auerbachsruhe' in honour of the well-known German novelist, a walk of three quarters of an hour brings us to the charmingly situated *Hof Avrona*, with a rural Inn. A further walk of fifteen minutes takes us to a small terrace affording a very fine view of the ravine of the Clemgia.

3. To the *Schwarzen See* above Avrona. On the right of the lake is a circular rock commanding a grand panorama.

4. Various routes lead to *Tarasp-Fontana*, — from the elm-wood nearly opposite the Villa of the Kurhaus; turning off to the right just before reaching the Hotel

Bellevue in Vulpera; and along the formerly rugged road between Vulpera and Tarasp-Fontana, — by either of these roads we may easily reach our destination in an hour and a half. From Fontana a steep footpath leads down to the Bonifaziusquelle.

5. Through Tarasp-Fontana to the little hamlets of *Chiaposch* and *Vallatscha* and further through delightful woods to *Aschera* ( $3\frac{1}{2}$  hours there and back).

6. From Vulpera across the Clemgia bridge to the terrace with the new rifle-butts opposite Schuls; or from Unter Schuls across the new bridge over the Inn, up the steep and rocky road into the Scarlthal, ascending to the plateau of *St. Ion*, a magnificent pasture-ground in the midst of dense and delightfully shady forests, which seem as though they had been made for picnics. From different points fine views up and down the valley may be obtained.

7. From the Rifle Grounds at Schuls, along the road by the river, leading through shady woods to the hamlet of *Pradella*; to the right of the bridge, across the brook, stands a rustic tavern. We may return by

the lower and less shady road leading across another bridge to Unter Schuls (one hour).

8. We may continue this route from Pradella through forests to the hamlet of *Suræn*, opposite to Remüs, here crossing the Inn to Crusch and returning by the high road.

9. By carriage to *Crusch* and from here walk to the lovely *Val d'Uina*, surrounded by huge mountains, along the newly constructed roads to the little hamlets of Outer and Inner Uina (Romansch *Uina da Dour Uina* and *da Daint*).

10. Along the road beginning at Schuls and leading through the romantic, wooded Scarlthal, to *Scarl* (5948 feet; an inn near the large village fountain). Ascent about 4 hours, descent about 3 hours, and therefore requiring an entire day. It is advisable to take provisions. From a bridge over the Clemgia along this route a path branches off through the Val Minger, by which a mountain pass leads to Alp Laisch in the Val Plafna and Tarasp-Fontana in about eight hours. Not a difficult route.

11. Through Fettan and the Alp Laret into the grand and wildly picturesque *Val*

*Tasna*, at first narrow and gorge-like but afterwards increasing in width.

### C. Mountain climbing.

The ascent of the following mountains may be accomplished without difficulty, and the view from their summits will fully repay the climber for his labour:

1. The *Motta Jüda* (7822') near Tarasp-Fontana.

2. The *Motta Naluns* (7031').

3. The *Piz Glüna* (9147') near Fettan.

4. The *Piz Champatsch* (9623') behind Schuls.

The ascent of (5) the *Piz Minschun* (10,076') behind Fettan, and of (6) the *Piz Lischanna* (10,181') is attended with more fatigue and difficulty. The latter is reached by a newly constructed foot-path in the *Val Lischanna*, between the *Piz Lischanna* and the *Piz St. Ion*, and which leads in manifold windings to the club hut built in the rock, and thence in long zigzags to the summit, adorned with an iron flag. (Ascent 5 hours, descent 4 hours; guide advisable). For practised mountaineers the

descent across the Lischanna glacier into the Val Scesyenna down to Scarl is very interesting.

## XI. How to reach Tarasp-Schuls.

1. In the north the railway station of *Landquart* is the chief starting-point for Tarasp-Schuls, which may be reached either by diligence or private conveyance through Prättigau and Klosters to the well-known health resort of Davos, and from here over the Flüela Pass and through Süs to Tarasp-Schuls. In summer there are two diligences from Landquart daily, one leaving early in the morning and reaching Tarasp-Schuls in 13½ hours; the other starting in the afternoon, halting for the night at Davos-Dörfli, and reaching its destination about noon next day.

From London the shortest route is probably *via* Harwich-Antwerp-Brussels-Luxemburg-Metz-Strasburg-Bâle-Zurich to Ragatz, (Hof Ragatz; Quellenhof; good private con-

veyances to Tarasp); here taking a short rest and then proceeding by way of Landquart as above.

From Paris *via* Mulhouse-Bâle or *via* Pontarlier-Neuchatel to Zurich and Landquart. Those who do not mind making a detour may go to Coire and thence enter the Engadine by the Albula or Julier Pass.

2. In the east the completion of the Arlberg Railway, now in course of construction, will materially lessen the distance between Tarasp-Schuls and the nearest railway station.

a) The line from *Innsbruck* to Landeck is to be opened in 1882; at present the journey must be made by diligence or private conveyance, and occupies from 9 to 11 hours. From Landeck through Nauders and without crossing the mountains in 9—11 hours by diligence or private carriage, to Tarasp-Schuls.

b) A short line from *Botzen* to Meran will soon be opened. *Via* Nauders Tarasp-Schuls is a day's drive from Meran.

3. From the south (Italy) *via* Milan, Como, Chiavenna and the Maloja Pass (8—9 hours) to St. Moritz or Samaden,

and thence into the Lower Engadine. Less frequented routes are: through Veltlin and Tirano, and across the Bernina Pass to Samaden; and through Veltlin to Bormio, then across the magnificent Stelvio Pass into the Tyrol, and from here *via* Nauders to Tarasp-Schuls.

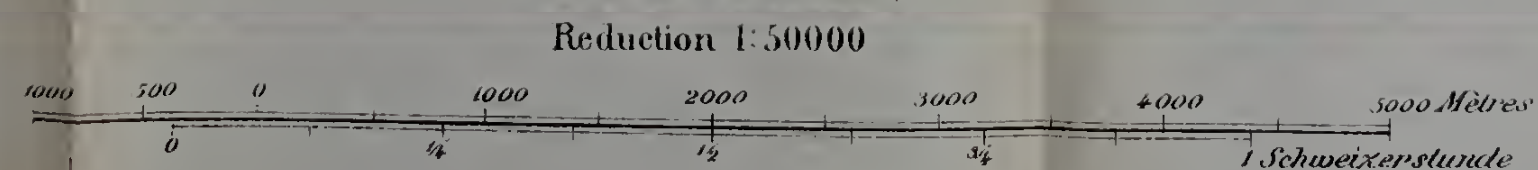




# UMGEBUNG VON TARASP - SCHULS



- Poststrassen
- Fuhrstrassen
- Karrensträsschen u. Stauwege
- Flussspide



- Kirche
- + Kapelle
- △ Trigonometrischer Punkt
- Mq. Mineralquellen







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